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A REPORT ON STATE AND LOCAL AIR POLLUTION CONTROL AGENCY MANPOWER RESOURCES

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National Center for Air Pollution Control
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by

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INTRODUCTION

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This report is primarily concerned with existing manpower resources of State and local air pollution control agencies. It deals with the following aspects of the manpower problem: (1) the present allocation of manpower resources by State and local governments for air pollution control; (2) the current salary levels of air pollution control personnel; (3) the education and experience requirements for air pollution control personnel; (4) recruitment problems; and (5) employee training and development policies and programs.

This report is based on the findings from a survey of State and local air pollution control agencies which was conducted in March and April of 1967 by the Social and Economic Studies Section, Office of Legislative and Public Affairs, National Center for Air Pollution Control. The aim of the survey was to help provide meaningful answers to the following questions:

1. What is the actual extent of the "manpower shortage" in State and local agencies? Are control agencies adequately staffed to carry out their present responsibilities? In what disciplines or occupational areas are there noticeable shortages of personnel?

2. Are salary levels for various professional, administrative, and technical categories competitive with those of industry, educational institutions, and the Federal Government?
3. What are the present education and experience requirements for air pollution control personnel?
4. What is the present level of professionalism in State and local air pollution control agencies? Is it adequate?
5. What are the present training and recruitment policies, programs and practices of air pollution control agencies?
6. What are the variations in the above factors among agencies by size, governmental unit, and organizational status?

Finding the answers to these and similar questions is a necessary first step in carrying out the investigations and studies on future manpower needs which are required under Section 305(b) of the Air Quality Act. Baseline data are a prerequisite to making accurate estimates of future manpower needs in several ways. First, it provides program planners with an overall view of the problem. Such data indicate how far we have yet to go to achieve a generally adequate level of manpower allocation for air pollution control.

Secondly, baseline data are necessary in order to effectively structure NCAPC training and manpower assistance programs to take account of variations in manpower requirements among control programs at various stages of development and differing widely in organization, size, and efficiency. For example, established agencies with on-going control programs, already staffed with experienced professional personnel, are probably in a better position to employ, train, and effectively utilize recently graduated engineers, scientists, and technicians than are agencies which are just beginning to develop and establish control programs. The established programs have already reached the "take off" point and are capable of meeting their future needs for experienced leadership and direction largely through internal promotion policies. By contrast, those programs which are in the development and establishment stages can be staffed with experienced personnel only through recruitment from outside. Hence, their manpower requirements would seem to be generally more critical than those for established programs. Baseline data are necessary in order to identify what proportion of programs and which specific programs have not yet reached the "take off" point.

Thirdly, baseline data are useful in identifying existing or potential obstacles to meeting future manpower requirements. Such obstacles might include low salaries, rigid education and experience requirements, and other restrictions, such as residence requirements, which may be irrevelant to air pollution control work itself. Knowledge of these and other problems in recruiting personnel by State and local agencies should be in the planning,development and evaluation of NCAPC training and manpower assistance programs.

1. SURVEY METHOD

There are two basic approaches to gathering personnel data through a survey. The first approach requires that each job class, for which data is sought, is carefully defined in the questionnaire itself. Such a definition would specify the job functions and level of responsibility for each particular job class. It might also specify the experience and eduction requirements if these factors were to be held constant. The respondent would then be requested to provide certain data (e.g., salaries) only for those positions in his agency which fit the job class definitions. Hence, he would need to make a judgement as to whether or not a particular job class substantially met the standard definition given in the questionnaire. Using this approach, information would be reported only on those job classes which fall within one of the definitions as he interprets them; information on all job classes not covered by a definition would be excluded.

The second approach, and that used in this survey, requires only that the respondent list each job class title for which he has at least one position budgeted and that he attach an official job class description to the questionnaire. Salary data, as well as education and experience requirements data, are entered by the respondent on the questionnaire opposite each listed job class title. This approach requires that information on all job classes be reported by the agency. (See Appendix A).

Once the data have been collected, each job class description is analyzed and classified into one of a number of standardized job classes. If it becomes evident during the data analysis that a significant number of job classes, having substantially the same characteristics, has been reported and that they do not fall within any of the standardized job class definitions, a new standardized job class is then created. (See Appendix B).

The latter approach has several advantages over the first. By requesting the agency to list all job classes for which one or more positions have been budgeted, a complete profile of each agencies' staff can be developed. Secondly, the validity of aggregations and comparisons of certain data among agencies is enhanced by centrally classifying the reported job classes into standardized job classes rather than permitting the respondent to make that judgement. Each respondent would interpret these definitions somewhat differently and there would be no way of checking the correctness of such judgements unless each job class description was analyzed. A third advantage of this approach is that it minimizes the burden on the responding agency. All that is essentially required of the agency is that it list each job class by title and provide official job class descriptions. The respondent is not required to read through a set of lengthy standardized job class descriptions and match these with the job classes in his own agency.

Once the questionnaire was developed and approved by the Bureau of the Budget (No. 68-6607), it was printed and prepared for distribution. Regional mailing lists of State and local agencies were prepared with the advice of NCAPC Regional Offices. The survey plan provided for distribution to agencies directly from Washington and the return of the questionnaire to the appropriate Regional Offices for screening and any necessary follow-ups.

The questionnaires were distributed during March 1-8 to 375 agencies. Each questionnaire had the return address of the appropriate Regional Representative and a requested return date of April 1, 1967. The Regional Representatives were instructed to forward all completed questionnaires to NCAPC headquarters by April 30, 1967.

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2. RESPONSE TO MANPOWER QUESTIONNAIRE

An agency was counted as having responded either if it returned a completed questionnaire or if it notified NCAPC in writing that it did not have an air pollution control program. Of the 375 agencies of all types which were mailed questionnaires, 238 or 63% responded. Table I summarizes the response to the questionnaire. There were 147 agencies reporting annual budgets of $10000 or more and 22 agencies with budgets of less than $10000 which responded to the questionnaire. Sixty-nine agencies reported that they had no air pollution control program budget.

The rate of response among those agencies having a program budget of $10000 or more was considerably higher than that indicated by the gross percentage of responses. It is estimated that slightly over 80% of all agencies with identifiable air pollution control programs did respond to the questionnaire. These agencies account for at least 90% of all regular full-time positions budgeted by State and local governments for air pollution control work.

Table 2 provides a detailed analysis of responses from agencies in each of the nine Regions. In every Region but one, the response rate for State agencies was greater than for local

TABLE 1

SUMMARY OF RESPONSES BY AIR POLLUTION CONTROL AGENCIES TO MANPOWER SURVEY

Number of questionnaires distributed	375
Number of agencies responding	238
. Programs having annual budgets of $10000 or more	147
• Programs having minimal annual budgets of less than $10000	22
• Agencies reporting no programs	69
Percentage of agencies responding	63%
Estimated number of all agencies surveyed with program budgets of $10000 or more	181
Estimated number of those agencies surveyed with program budgets of $10000 or more which did not respond	34
Estimated percentage of all agencies surveyed with budgets of $10000 or more which responded	81%

TABLE 2.

ANALYSIS OF RESPONSES BY AIR POLLUTION CONTROL AGENCIES TO MANPOWER SURVEY

	HEW - PHS REGIONS									
	1	2	3	4	5	6	7	8	9	Total
Number of questionnaires distributed	27	71	38	36	93	32	27	13	38	375
Number of agencies responding	18	33	28	29	49	22	17	11	31	239
State agencies										44
Reporting program budgets of $10,000 or more	3	3	5	4	4	2	5	2	5	33
Reporting program budgets of less than $10,000	0	0	0	0	0	0	0	1	0	1
Reporting no program	1	0	1	1	1	3	0	0	3	10
Local agencies										
Reporting annual budgets of $10,000 or more	7	16	15	20	19	9	6	4	19	115
Reporting annual budgets of less than $10,000	1	5	2	0	8	2	0	1	2	21
Reporting no program	6	9	5	4	17	6	6	3	3	59
Percentage of agencies responding	67%	46%	74%	81%	53%	69%	63%	85%	82%	63%
Estimated number of all agencies surveyed with budgets of $10,000 or more	14	28	27	26	29	12	12	8	25	181
State agencies	3	4	6	5	4	2	5	4	4	37
Local agencies	11	24	21	21	25	10	7	4	21	144
Estimated number of those agencies surveyed with budgets of $10,000 or more which did not respond	4	9	7	2	6	1	1	2	2	34
State agencies	0	1	1	1	0	0	0	2	0	5
Local agencies	4	8	6	1	6	1	1	0	2	29
Estimated percentage of all agencies surveyed with budgets of $10,000 or more which did respond	71%	68%	74%	92%	79%	92%	92%	75%	92%	81%
State agencies	100%	75%	83%	80%	100%	100%	100%	50%	100%	87%
Local agencies	64%	66%	71%	95%	76%	90%	86%	100%	90%	80%

agencies. Of the 195 local agencies responding, 115 had budgets of $10000 or more, 21 had budgets of less than $10000 and 59 reported having no program budgets. Of the 43 State agencies responding, 32 reported program budgets of $10000 or more, 1 reported a budget of less than $10000 and 10 reported having no regular program budget. One State, California, had two separate agencies which reported - the State Department of Public Health and the Motor Vehicle Pollution Control Board. In twenty-six of the States, primary responsibility for air pollution control rested with the State Health Department. In the remaining six States, independent agencies had primary responsibility.

Table 3 shows the number of local agencies, reporting annual budgets of $10000 or more, classified by population served and type of agency. Air pollution programs administered by health agencies accounted for 63% of the local agencies reporting. The remaining programs were divided about equally between those administered by safety, heating and building inspection agencies on one hand and independent agencies on the other.

Of the 115 local control agencies with budgets of $10000 or more responding, 54 (47%) were city agencies, 51 (44%) were county, multi-county or consolidated city-county agencies and 10 (9%) were special district agencies or authorities established under State enabling legislation. There appeared to be no change in the overall distribution of local control agencies between city jurisdictions on one hand and county, multi-county and consolidated city-county jurisdictions on the other since 1965. Virtually all large city, county and special district agencies responded to the questionnaire. There were a few local agencies serving medium-sized jurisdictions which did not respond.

TABLE 3

RESPONSES TO QUESTIONNAIRE: LOCAL AGENCIES REPORTING BUDGETS OF $10000 OR MORE WITHIN F. Y. 1967

	TYPE OF LOCAL JURISDICTION							
	Cities[1]			Counties, Muti-counties and City-counties[2]			Special Districts and Authorities[3]	Total
Pop. of Agency's Jurisdiction	Indep.	Health	Other	Indep.	Health	Other		
0-49999	0 (0)	2 (2)	2 (2)	0 (0)	0 (0)	0 (0)	0 (0)	4 (4)
50000-99999	3 (2)	6 (4)	3 (2)	0 (0)	6 (6)	0 (0)	0 (0)	18 (14)
100000-199999	1 (0)	5 (4)	4 (2)	2 (1)	12 (9)	0 (0)	2 (2)	26 (18)
200,000-499999	1 (1)	5 (3)	8 (2)	1 (0)	20 (15)	1 (1)	3 (1)	39 (23)
500,000-999999	0 (0)	3 (3)	3 (2)	0 (0)	7 (5)	0 (0)	3 (1)	16 (11)
1000000-1,999,999	0 (0)	1 (0)	1 (1)	1 (1)	4 (3)	0 (0)	0 (0)	7 (5)
2,000,000 and over	2 (2)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	2 (2)	5 (5)
Total	7 (5)	23 (17)	21 (11)	4 (2)	49 (38)	1 (1)	10 (6)	115 (80)

() Denotes number of agencies receiving PHS control program grant awards from F.Y. 1967 funds

1/ Includes city agencies which provide service to the county or city under a service contract

2/ Includes agencies which were established jointly by two or more counties or city and a county under an interlocal compact or other agreements authorized under state joint-power legislation

3/ All air pollution control special districts and authorities are considered here as independent agencies

3. TOTAL MANPOWER IN STATE AND LOCAL CONTROL AGENCIES

The 239 State and local agencies which responded to the NCAPC survey accounted for an estimated 90% of the total manpower budgeted by all State and local governments for air pollution control. Table 4A summarizes the responses of the 136 local agencies which reported an air pollution control budget of at least $5000 for FY 1967. These agencies reported a total of 1463 full-time and 374 part-time positions. Taking into account those agencies reporting a budget of less than $5000, and those agencies which failed to respond, the total number of positions budgeted by all local agencies in FY 1967 probably did not exceed 1600 full-time and 400 part-time positions.

Table 4B summarizes the responses of 34 State agencies, 33 of which reported a budget of $10000 or more for FY 1967. These agencies reported a total of 587 full-time and 109 part-time positions. All State control agencies taken together, including those which did not respond and those which reported having no separate budget for air pollution control, probably did not budget in excess of 650 full-time and 135 part-time positions for FY 1967.

TABLE 4A

POSITIONS BUDGETED BY 136 LOCAL AGENCIES FOR AIR POLLUTION CONTROL ACTIVITIES (FY 1967)

Pop. of Agency Juris-diction	No. of Agencies Report-ing	*	Eng	Chm	Mtr	Stat	San	Oth Sci	Insp	Mgn & Adm	Tech	All Oth	Total
0-49,999	8	FT	0	0	0	0	4	0	9	1	1	1	16
		PT	0	0	0	0	3	2	1	0	0	5	11
50,000-99,999	22	FT	4	2	0	0	1	1	12	0	1	10	31
		Pt	4	3	0	0	18	3	3	1	8	15	55
100,000-199,999	34	FT	15	5	1	0	29	0	27	1	3	12	93
		PT	8	0	0	0	40	2	1	1	7	30	89
200,000-499,999	43	FT	38	14	0	0	38	3	56	2	17	37	205
		PT	22	4	0	0	28	4	25	2	4	30	119
500,000-999,999	18	FT	39	18	3	0	25	24	80	2	23	37	251
		PT	10	1	0	0	48	4	2	1	1	9	76
1,000,000-1,999,999	6	FT	34	15	1	1	10	9	47	0	17	22	156
		PT	2	0	0	0	1	1	0	0	0	1	5
2,000,000 and over		FT	152	34	7	8	1	21	230	31	52	175	711
	5	PT	7	5	0	0	0	0	0	0	5	2	19
		FT	282	88	12	9	108	58	461	37	114	294	1463
Sub Total	136	PT	53	13	0	0	138	16	32	5	25	92	374
Total-Full & Part Time			335	101	12	9	246	74	493	42	139	386	1837

TABLE 5

POSITIONS BUDGETED BY 34 STATE AGENCIES FOR AIR POLLUTION CONTROL ACTIVITIES (FY 1967)

Pop. of Agency Juris-diction	No. of Agencies Report-ing	*	Eng	Chem	Mtr	Stat	San	Oth Sci	Insp	Mgn & Adm	Tech	All Oth	Tota
999,999-		FT	4	6	0	0	2	4	1	0	3	3	23
or less	7	PT	7	1	0	0	2	5	6	0	0	2	23
1,000,000-		FT	17	19	0	0	7	3	4	0	11	20	81
2,999,999	7	PT	9	3	0	0	6	2	5	0	0	9	34
3,000,000-		FT	36	18	1	1	13	6	0	1	10	22	108
4,999,999	10	PT	14	0	0	0	0	0	0	0	0	0	14
5,000,000-		FT	65	9	3	0	13	2	14	2	20	26	154
9,999,999	6	PT	2	1	0	0	0	0	0	0	0	2	5
10,000,000-		FT	86	10	2	7	4	6	0	2	38	66	221
and over	4	PT	2	25	0	0	0	0	0	0	1	5	33
Sub Total	34	FT	208	62	6	8	39	21	19	5	82	137	587
		PT	34	30	0	0	8	7	11	0	1	1	109
Total-Full and Part Time			242	92	6	8	47	28	30	5	83	138	696

Table 5 shows the number of full-time budgeted positions which were reported vacant as of April 1967. Of a total of 2050 positions budgeted by the 136 local and 34 State agencies reporting, 354 or 17% were vacant. The vacancy rate for State agencies for all positions was 23% as compared with 15% for local agencies. This difference reflects the more rapid expansion of State control programs within the past year during which some 30 States enacted new legislation. Applying the percentages in Table 5 to the estimated total number of budgeted positions yields the following estimate of the number of actual personnel employed in air pollution control programs as of April 1967:

	Number Personnel Employed		
	Full time	Part time	Total
State Agencies	500	104	605
Local Agencies	1360	340	1700
Total	1861	444	2305

TABLE 5

PERCENTAGE OF VACANCIES IN STATE AND LOCAL AIR POLLUTION CONTROL AGENCIES (FY 1967)

(Full-time Positions)

	Local Agencies			State Agencies			Combined		
	Budgeted Positions	Number Vacant	% Vacant	Budgeted Positions	Number Vacant	% Vacant	Budgeted Positions	Number Vacant	% Vacan
Engineers	282	52	18%	208	50	24%	490	102	21%
Chemists	88	5	6%	62	15	24%	150	20	13%
Meteorologists	12	1	8%	6	1	17%	18	2	11%
Statisticians	9	2	22%	8	3	38%	17	5	29%
Other Scientists	58	22	38%	21	6	29%	79	28	35%
Inspectors	461	36	8%	19	2	11%	480	38	8%
Mgmt. & Adm.	37	3	8%	5	0	0	42	3	7%
Technicians	114	32	28%	82	26	32%	196	58	30%
Sanitarians	108	19	18%	39	4	10%	147	23	16%
All Other	294	38	13%	137	26	19%	431	64	15%
Total	1463	220	15%	587	134	23%	2050	354	17%

TABLE 6

Percentages of Total Full and Part Time Positions Budgeted by State and Local Air Pollution Control Agencies - Stratified by Population of Agency Jurisdiction

A. **Local Agencies**

Population of Agency Jurisdiction	Percentages of Total Positions Budgeted		Cumulative Percentages of Total Positions Budgeted	
	Full time	Part time	Full time	Part time
49,999 or less	1.1%	2.9%	1.1%	2.9%
50,000 - 99,999	2.1	14.9	3.2	17.8
100,000-199,999	6.4	23.7	9.6	41.5
200,000-499,999	14.0	31.8	23.6	73.3
500,000-999,999	17.2	20.3	40.8	93.6
1,000,000-1,999,999	10.7	1.3	51.5	94.9
2,000,000 or greater	48.5	5.1	100.	100.
Total	100%	100%		

B. **State Agencies**

Population of State	Percentages of Total Positions Budgeted		Cumulative Percentages of Total Positions Budgeted	
	Full time	Part time	Full time	Part time
999,999 or less	3.9%	21.1%	3.9%	22.0%
1,000,000 - 2,999,999	13.8	31.2	17.7	52.3
3,000,000-4,999,999	18.4	12.8	36.1	65.1
5,000,000-9,999,999	26.2	4.6	62.3	69.7
10,000,000 and over	37.7	30.3	100.0	100.0
Total	100%	100%		

Table 6 shows the percentages of total full and part-time positions budgeted by State and local agencies, stratified by population of agency jurisdiction. The 11 local air pollution agencies serving jurisdictions of 1,000,000 or greater population which responded accounted for nearly 60% of the total full-time positions but only 6.4% of the part-time positions. The five largest local control agencies, all serving populations of at least 2,000,000, accounted for 48.5% of the total number of full-time positions. By contrast the 64 local agencies serving populations of 200,000 or less accounted for only 9.6% of the total number of full-time positions. It is clear that a few major agencies employed most of the existing manpower.

As shown in Table 7, staff size is related roughly to the population served by the agency. The 64 responding agencies serving populations of 200,000 or less have average full-time staffing level of 1.8 positions and part-time level of 1.2 positions. By contrast, the five largest agencies averaged 142.2 full-time and 3.8 part-time positions. Agencies in the population category of 2,000,000 or greater have disproportionably larger staffs than do agencies in the 1,000,000 population category.

TABLE 7

AVERAGE NUMBER OF POSITIONS BUDGETED BY LOCAL AIR POLLUTION CONTROL AGENCIES WITHIN FISCAL YEAR 1967

Pop. of Agency Juris-diction	No. of Agencies Report-ing	*	Eng	Chem	Mtr	Stat	San	Oth Sci	Insp	Mgn & Adm	Tech	All Oth	Total
0-49,999	8	FT	0	0	0	0	.4	0	1	.1	.1	.1	1.8
		PT	0	0	0	0	.3	.2	.1	0	0	.6	1.2
50,000-99,999	22	FT	.2	.1	0	0	0	0	.5	0	0	.5	1.4
		PT	.2	.1	0	0	.8	.1	.1	0	.4	.7	2.5
100,00-199,999	34	FT	.4	.1	0	0	.8	0	.7	0	.1	.3	2.5
		PT	.2	0	0	0	1.1	0	0	0	.2	.8	2.4
[illegible]0,000-[illegible]9,999	43	FT	.9	.3	0	0	.9	.1	1.3	0	.4	.9	4.8
		PT	.5	.1	0	0	.7	.1	.6	0	.1	.9	2.8
500,000-999,999	18	FT	2.2	1.0	.2	0	1.4	1.4	4.5	.1	1.3	2.2	13.9
		PT	.6	0	0	0	2.7	.2	.1	0	0	.5	4.2
1,000,000-1,999,999	6	FT2	5.7	2.5	.2	.2	1.7	1.5	7.8	0	2.8	3.7	26.0
		PT	.3	0	0	0	.2	.2	0	0	0	.2	.8
2,000,000 and over	5	FT	30.4	6.9	1.4	1.6	.2	4.2	46.0	6.2	10.0	35.0	142.2
		PT	1.4	1.0	0	0	0	0	0	0	1.0	.4	3.8
All Agencies	136	FT	2.0	.6	.1	.1	.8	.4	3.3	.3	.8	2.1	10.4
		PT	.4	.1	0	0	1.0	.1	.2	0	.2	.7	2.7

The estimated increase in State and local air pollution control personnel is represented in Figure 1 and summarized in Table 8. Previous estimates of air pollution manpower are available only for 1961 and 1965. The figures shown for 1967 are the estimated number of employed personnel, not budgeted positions.

It is evident that since 1961 the increase in State and local control manpower has been modest. Local control agencies in 1967 had only about 660 full-time and 140 part-time personnel more than they had in 1961, an increase of only 83% and 70% for full-time and part-time personnel respectively. State control agencies have about 340 full-time and 75 part-time personnel more than they had in 1961, a percentage increase of 210% and 260% for full-time and part-time personnel respectively. Moreover, it appears that most of this increase during the 1961-67 period had taken place before 1965. In the 1961-65 period, local control personnel increased by 480 full-time and 120 part-time. In the 1965-67 period the increase was about 80 full-time and 20 part-time. State agencies increased their staffs by about 245 full-time and 52 part-time personnel during the 1961-65 period. The increase for the 1965-67 period was only an estimated 94 full-time and 23 part-time personnel. The estimated average annual increase in full-time personnel for local agencies during the 1961-65 period was 14%, compared with an estimated 3% for the 1965-67 period. The estimated increase for State agencies for the 1961-65 period was 35% annually compared with 12% annually for the 1965-67 period.

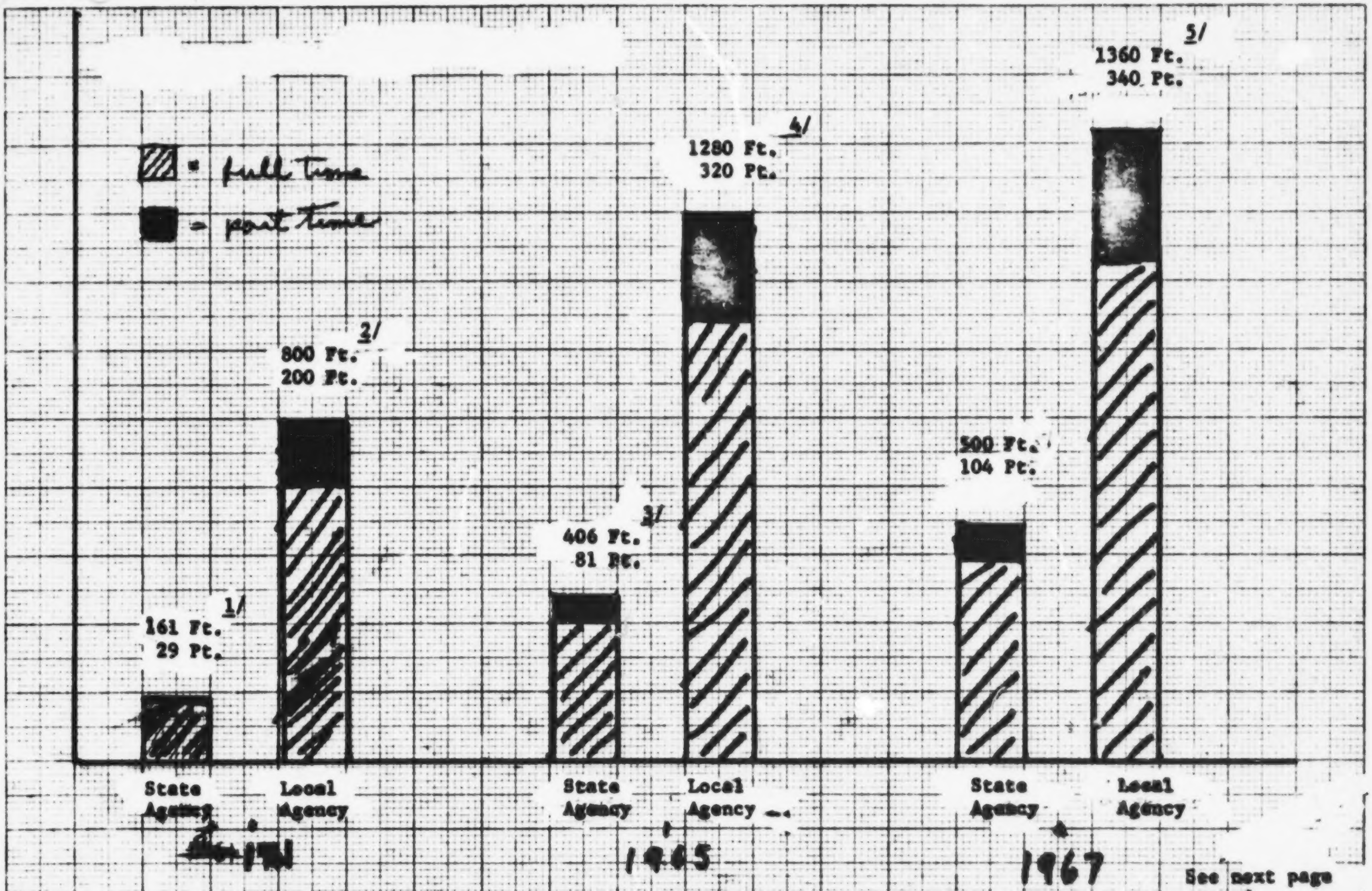


Figure 1: Growth in STATE & LOCAL ADC AGENCY MANPOWER (19[illegible]-1967)

See next page for footnotes

1/ Jean J. Schueneman "Air Pollution Problems and Control Programs in the United States". Journal of the Air Pollution Control Association, Table V, P. 1.

2/ Figures based on Schueneman, ibid, table VI, Page 12, and Schueneman, "A Roll Call of the Communities -- Where Do We Stand in Local Regional Air Pollution Control," Proceedings: The Third National Conference on Air Pollution, Washington, D. C., Dec. 12-14, 1966. p. 396.

3/ Charles D. Yaffe, "A Roll Call of the States -- Where Do We Stand in State and Interstate Air Pollution Control", ibid. p. 360.

4/ NCAPC Survey Data

5/ Ibid.

TABLE 8

ESTIMATED INCREASES IN STATE AND LOCAL AIR POLLUTION CONTROL AGENCY PERSONNEL, 1961-67

		Period					
		1961-67		1961-65		1965-67	
A.	Local Agencies	FT	PT	FT	PT	FT	PT
1.	Total absolute increase	660	140	480	120	80	20
2.	Average absolute annual increase	110	23	120	30	46	10
3.	Total percentage increase	83%	70%	60%	60%	6%	6%
4.	Average annual percentage increase	14%	15%	15%	15%	3%	3%

		Period					
		1961-67		1961-65		1965-67	
B.	State Agencies	FT	PT	FT	PT	FT	PT
1.	Total absolute increase	340	75	245	52	94	23
2.	Average annual increase	57	13	61	13	47	12
3.	Total percentage increase	210%	260%	150%	180%	23%	28%
4.	Average annual percent increase	35%	43%	38%	45%	12%	14%

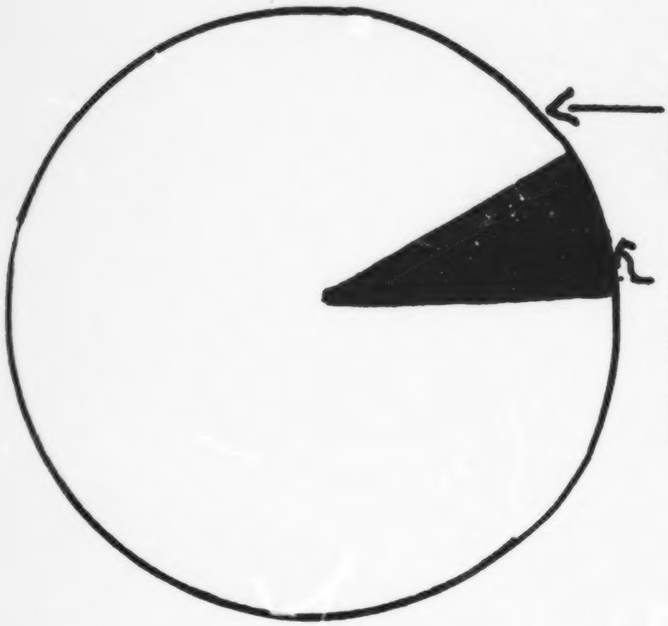
The manpower resources allocated to official air pollution control activities is almost infinitesmal in relation to the total number of scientific and technical personnel employed by State and local governmental agencies. The National Science Foundation reports that State governments employed a total of 48,029 professional scientists and engineers in 1962.(5) It was estimated also that local governments employed about 30,000 professional scientists and engineers in 1960.(6) By 1967, the numbers of personnel in these categories had increased substantially. It is probable that less than 1% of total professional engineering and scientific manpower resources of State and local governmental agencies is allocated to air pollution control activities.

Since State air pollution control programs are usually the responsibility of State health departments, it is appropriate to take a closer look at the scientific and engineering manpower resources of these agencies in order to obtain a clearer perspective of the air pollution control manpower situation. In 1962, State health and welfare agencies employed a total of 783 physical scientists and 1257 engineers of all types. The increase in State employed engineers, excluding civil engineers in State highway agencies, was about 90% for the period January 1959 to January 1962, or an average annual growth rate of 30%. The increase in physical scientists employed by all State agencies during this same period was 27.4% or an average annual growth rate of 9.1%. If the number of engineers and physical scientists employed by State health and welfare agencies continued to increase at about these same rates since 1962 there would be 3000 to 3500 engineers and 1000 to 1200 physical scientists in State health and welfare agencies for all programs.

If the above estimates are fairly accurate, it appears that State health agencies on the whole are allocating about 7 to 8 percent their engineering manpower and about 13 to 16 percent of their physical science manpower to air pollution control.

Figure 2 shows the estimated percentage of environmental health engineers and scientists allocated to State and local air pollution control programs. The National Center for Health Statistics estimates that there were approximately 8500 engineers and 2750 scientists employed in environmental health programs nationally in 1965.(8) Assuming an average annual increase of 10% since 1965 there would be about 9300 engineers and 3000 scientists employed in environmental health programs in 1967. Including both full-time and part-time budgeted positions, it appears that the nation as a whole is allocating about 6.7% of environmental health engineers and about 11% of its environmental health scientists to air pollution control activities at the State and local level.

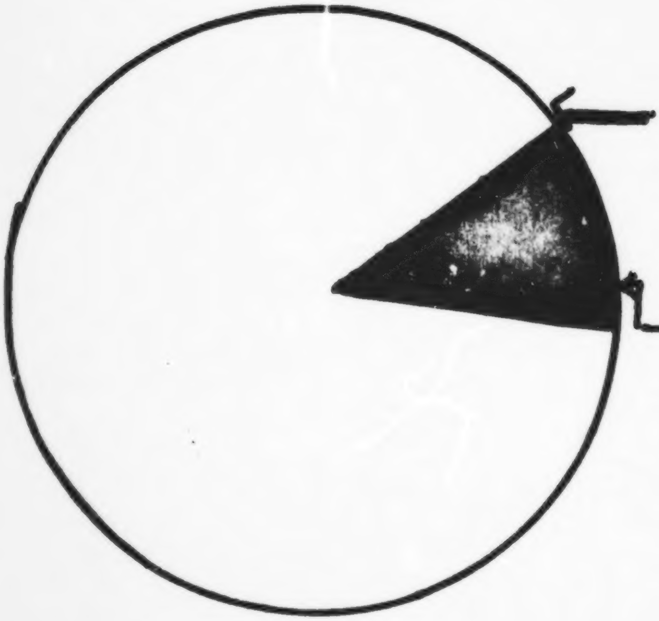
Figure 2. Percentage of all U.S. Environmental Health Engineers and Scientists Employed in State and Local Air Pollution Control Programs



Estimated total number of E.H. Engineers 9300 in 1967

577 engineers or about 6.2% of total were employed by State and local air pollution control agencies

A. Environmental Health Engineers



Estimated total number of E.H. scientists in 1967: 3000

330 scientists or about 11% of total were employed by State and local air pollution control agencies

B. Environmental Health Scientists

4. SALARIES OF AIR POLLUTION CONTROL PERSONNEL

This chapter contains the results of an analysis of the salary information contained in the responses.

Table 10 summarizes (a) data on starting salaries by position job classification and (b) data on maximum salaries for the same classifications.

Table 11 shows the starting and maximum national salary structure of State and local control agencies.

Table 12 shows starting and maximum salaries of highest-level positions in State and local control programs by major occupation category.

Table 13 shows similar salary information by size of agency.

Table 14 shows a percent distribution of working time as allocated to air pollution control activities by program directors.

Table 10 ·

DISTRIBUTION OF ANNUAL SALARIES* PAID BY STATE AND LOCAL AIR POLLUTION CONTROL AGENCIES, 1967

Starting Salaries

	Total Number Positions Reported	Lowest Salary	First Quartile	Second Quartile	Third Quartile	Highest Salary
Engineer						
All Agencies	396	6000	9000	10260	10790	15110
State Agencies	134	6000	8750	9630	12290	15110
Local Agencies	262	6000	9190	10590	10790	13860
Chemist						
All Agencies	123	5400	6020	7630	8510	13200
State Agencies	42	5400	5760	6200	7660	11990
Local Agencies	81	5520	6610	8230	8770	13200
Meteorologist						
All Agencies	15	6700	8000	9360	11990	12580
State Agencies	5	8270	----	8270	----	11990
Local Agencies	10	6700	----	9600	----	12580
Statistician						
All Agencies	15	6360	6790	8620	9816	10860
State Agencies	7	6360	----	9820	----	9820
Local Agencies	8	6790	----	6950	----	10860
Applied Scientist						
All Agencies	76	4140	7620	8760	11130	12620
State Agencies	20	4140	7100	9100	12620	12620
Local Agencies	56	4530	7620	8760	9140	12460
Sanitarian						
All Agencies	102	4200	6010	6660	7450	9170
State Agencies	22	4200	5250	7080	7510	7510
Local Agencies	80	5120	6170	6660	7000	9170
Inspectors						
All Agencies	428	3000	5200	7300	8350	9190
State Agencies	23	3000	3000	6050	6090	6090
Local Agencies	405	3830	6020	7490	8350	9190
Technician						
All Agencies	162	3600	4980	6590	7410	8210
State Agencies	56	3720	4750	5000	8210	8210
Local Agencies	106	3600	5660	6590	7410	7840
Management and Administration						
All Agencies	40	6200	8900	11710	13110	16400
State Agencies	2	11410	----	12710	----	12000
Local Agencies	38	6200	8900	11710	13110	16400

Table 10 (cont'd)

DISTRIBUTION OF ANNUAL SALARIES*
PAID BY STATE AND LOCAL
AIR POLLUTION CONTROL AGENCIES, 1967 (Cont'd)

Maximum Salaries

	Total Number Positions Reported	Lowest Salary	First Quartile	Second Quartile	Third Quartile	Highest Salary
Engineer						
All Agencies	387	7000	11400	12780	13440	19810
State Agencies	134	7200	12020	12550	14950	19810
Local Agencies	253	7000	10770	12780	13440	15650
Chemist						
All Agencies	119	6630	8520	9820	10710	16060
State Agencies	39	6630	9030	9360	10000	14570
Local Agencies	80	6630	8520	10540	10710	16060
Meteorologist						
All Agencies	16	8130	10270	11500	12370	15290
State Agencies	5	10740	----	10740	----	14570
Local Agencies	11	8130	----	12370	----	15290
Statistician						
All Agencies	15	8110	8440	11340	11920	13200
State Agencies	7	8110	----	11930	----	11930
Local Agencies	8	8440	----	8670	----	13200
Applied Scientist						
All Agencies	74	5040	9500	12080	12690	16870
State Agencies	16	5040	8320	12170	16870	16870
Local Agencies	58	5510	9500	11360	12080	15520
Sanitarian						
All Agencies	97	5830	7720	8360	9540	10390
State Agencies	20	6000	6660	8760	10060	10060
Local Agencies	77	5830	7750	8260	9120	10390
Inspectors						
All Agencies	430	4500	7900	9370	10330	10650
State Agencies	16	4500	6080	7660	8920	9370
Local Agencies	414	5040	7900	9420	10330	10650
Technician						
All Agencies	162	5000	6370	8460	9620	10420
State Agencies	56	5040	6140	6400	9620	9620
Local Agencies	106	5000	7120	8460	9840	10420
Management and Administration						
All Agencies	36	8100	9890	13740	14580	19930
State Agencies	2	12000	----	12940	----	13870
Local Agencies	34	8100	9090	13740	14580	19930

Table 10 (Cont'd.)

* Quartiles for each occupational category were computed from the ranked array of values representing the weighted averages of the starting and maximum salaries for each agency. For example, if an agency had a total of 10 engineers' positions budgeted for air pollution control work, five positions starting at $7000, three positions starting at $9000, and two positions starting at $12000, the representative starting salary for that agency is the average of the three starting salaries weighted by the number of positions at each salary level. In this case the representative starting salary would be:

$$\frac{(5)\ (\$7000) + (3)\ (\$9000) + (2)\ (\$12000)}{10} = \$8600$$

In computing the quartiles, the representative starting salary, e.g., $8600, would be weighted by the total number of engineers' positions in the agency.

Only the salaries of those positions budgeted for full-time work in air pollution control are included in this analysis. Positions for which any time is allocated to work other than air pollution control are excluded. By using the weighted average salary for all job classes or levels within an occupational category, rather than the salary of the lowest or highest job class, a more representative distribution of salaries for all agencies is obtained.

Table 11.

NATIONAL SALARY STRUCTURE OF STATE AND LOCAL AIR POLLUTION CONTROL AGENCIES

Starting Salaries

	Number Agencies Reporting	Lowest Salary	First Quartile	Second Quartile	Third Quartile	Highest Salary
Engineers						
All Agencies	75	6000	8148	9000	10182	15106
State Agencies	24	6000	7920	9130	9677	15106
Local Agencies	51	6000	8300	9000	10200	13860
Chemist						
All Agencies	56	5400	6204	7036	8100	13200
State Agencies	21	5400	5760	6720	7746	11988
Local Agencies	35	5520	6528	7252	8238	13200
Meteorologist						
All Agencies	10	6698	8268	9360	11988	12576
State Agencies	3	8286	----	8400	----	11988
Local Agencies	7	6698	----	9360	----	12576
Statistician						
All Agencies	6	6360	----	7800	----	10860
State Agencies	2	6360	----	8088	----	9816
Local Agencies	4	6360	----	8088	----	9816
Applied Scientists						
All Agencies	23	4140	6071	8651	9888	12616
State Agencies	8	4140	6520	8412	9100	12616
Local Agencies	15	4534	6071	7620	9135	12429
Sanitarian						
All Agencies	42	4200	5748	6480	7400	7165
State Agencies	7	6000	7380	8760	9450	10058
Local Agencies	35	5124	6171	6470	7002	9165
Inspector						
All Agencies	53	3000	5256	6087	6744	9188
State Agencies	3	3600	----	6048	----	6087
Local Agencies	50	3830	5200	6024	6870	9188
Technician						
All Agencies	45	3600	4980	5940	6800	8206
State Agencies	16	3720	4650	4989	6493	8206
Local Agencies	29	3600	5634	6045	6800	7844
Management and Administration						
All Agencies	11	4817	8267	10980	12000	16400
State Agencies	3	4817	----	11412	----	12000
Local Agencies	8	6200	----	8900	----	16400

Table 11. (Cont'd.) NATIONAL STRUCTURE OF STATE AND LOCAL AIR POLLUTION CONTROL AGENCIES (Cont'd.)

Maximum Salaries

	Number Agencies Reporting	Lowest Salary	First Quartile	Second Quartile	Third Quartile	Highest Salary
Engineer						
All Agencies	73	7000	10165	11400	12636	19813
State Agencies	24	7200	10800	11975	12551	19813
Local Agencies	49	7000	10165	11300	12636	15647
Chemist						
All Agencies	52	6624	8148	9168	10710	16056
State Agencies	22	6624	8220	9360	10800	14338
Local Agencies	30	6708	8148	8958	10710	16056
Meteorologist						
All Agencies	11	8133	9000	11000	14559	15288
State Agencies	3	10000	----	10736	----	14568
Local Agencies	8	8133	----	11135	----	15288
Statistician						
All Agencies	6	8112	----	9823	----	13200
State Agencies	2	8112	----	10018	----	11924
Local Agencies	8	8436	----	9823	----	13200
Applied Scientists						
All Agencies	23	5040	7776	10968	12170	16872
State Agencies	8	5040	----	11085	----	16872
Local Agencies	15	5512	7750	10968	12077	15523
Sanitarian						
All Agencies	40	5832	7560	8273	9115	10392
State Agencies	7	6000	----	8760	----	10058
Local Agencies	33	5832	7625	8256	9024	10392
Inspector						
All Agencies	51	4500	6483	7560	8756	10654
State Agencies	3	4500	----	7659	----	9372
Local Agencies	48	5040	6483	7531	8756	10654
Technician						
All Agencies	44	5000	6144	7329	8950	10416
State Agencies	17	5040	6000	6400	8400	9623
Local Agencies	27	5000	6582	7855	8950	10416
Management and Administration						
All Agencies	7	8100	----	13736	----	19932
State Agencies	6	8200	----	14156	----	19932
Local Agencies	1	8100	----	8100	----	8100

Table 12.

SALARIES OF HIGHEST-LEVEL POSITION* IN STATE AND LOCAL AIR POLLUTION CONTROL PROGRAMS BY OCCUPATIONAL CATEGORY, 1967

(*Position budgeted for at least 50% of official time in air pollution control activities)

OCCUPATIONAL CATEGORY	STARTING SALARY					
	Number Agencies Reporting	Lowest Salary	First Quartile	Second Quartile	Third Quartile	Highest Salary
All Categories	121	3700	7581	9992	12571	23676
Engineers	69	6000	9000	11128	13090	22800
Applied Scientists	9	6801	7758	9600	10975	16000
Sanitarians	13	5700	6174	7308	7852	8517
Inspectors	10	4500	4625	5689	7043	7800
Miscellaneous	20	3700	7032	10220	13200	23676

OCCUPATIONAL CATEGORY	MAXIMUM SALARY					
	Number Agencies Reporting	Lowest Salary	First Quartile	Second Quartile	Third Quartile	Highest Salary
All Categories	117	5000	9460	12000	15175	29484
Engineers	64	7000	11256	13386	16056	26310
Applied Scientists	9	8881	10667	13836	14633	16000
Sanitarians	13	7368	7896	9120	9628	11416
Inspectors	10	6000	6219	7145	8338	9580
Miscellaneous	21	5000	9315	12000	17350	29484

Table 13.

SALARIES OF HIGHEST-LEVEL POSITION* IN STATE AND LOCAL AIR POLLUTION CONTROL PROGRAMS BY SIZE OF PROGRAM STAFF, 1967

(*Positions budgeted for at least 50% of official time in air pollution control)

STAFF SIZE Full Time Personnel Only	STARTING SALARY					
	Number Agencies Reporting	Lowest Salary	First Quartile	Second Quartile	Third Quartile	Highest Salary
All Agencies	121	3700	7581	9992	12571	23676
1 - 4	57	3700	6480	7620	10000	13860
5 - 9	27	6100	8918	10642	12012	20844
10 - 24	24	6900	9834	12146	13519	20000
25 or more	13	10058	12736	16800	22692	30000

STAFF SIZE Full Time Personnel Only	MAXIMUM SALARY					
	Number Agencies Reporting	Lowest Salary	First Quartile	Second Quartile	Third Quartile	
All Agencies	117	5000	9460	12000	15125	29484
1 - 4	55	5000	3100	9624	11500	15288
5 - 9	25	7600	10560	12372	14580	20044
10 - 24	24	9516	12932	14754	18122	22608
25 or more	13	14628	16056	17104	22584	30000

Table 14.

DISTRIBUTION OF WORKING TIME ALLOCATED TO AIR POLLUTION CONTROL ACTIVITIES BY PROGRAM DIRECTORS

OCCUPATIONAL CATEGORY	24% or less	25-49%	50-74%	75% or more	Total
All Categories	36	19	19	75	149
Engineers	11	10	11	46	78
Applied Scientists	5	5	0	3	13
Sanitarians	5	3	3	4	15
Inspectors	2	0	0	7	9
M. D.'s	9	0	3	0	12
Miscellaneous	4	1	2	15	22

5. EDUCATION AND EXPERIENCE REQUIREMENTS OF AIR POLLUTION CONTROL PERSONNEL

The education and experience requirements for air pollution control personnel were considered to be important aspects of the survey because such requirements or standards largely determine the overall level of professionalism in the field. At the same time such standards place major limitations on the ability of control agencies to adequately staff their programs. If an agency's requirements are substandard or too flexible, the quality of its program will suffer. On the other hand if the requirements are too rigid and restrictive, or are unrealistically demanding in terms of formal educational achievement, then it is probable that the agency will fail to attract an adequate number of qualified personnel for the salaries which it can offer.

Most of the agencies reporting personnel data indicated that they were subject to civil service procedures in establishing experience and education qualifications for the various job classes. In some cases education and experience requirements are prescribed by law or ordinance, but in most cases they are established by the regulations of either the state or local civil service commission or by the parent agency (usually the health department) administering the air pollution control program.

The requirements reported varied considerably in specificity to air pollution work depending upon the size of air pollution program, the type of agency in which it was located and the type and size of governmental unit. Generally, the larger air pollution control agencies at both the State and local level had education and experience requirements which were most specific to air pollution control work itself. Senior level positions in most job categories usually required the incumbent to have had a certain number of years experience in some phase of air pollution control work. In no instance, however, did an agency report formal college level training specifically in air pollution control as an absolute requirement for employment in any job class.

Education and experience requirements were more generally stated for the smaller agencies. Frequently in the case of small air pollution programs integrated with other environmental health programs, the standards did not specify either formal training, knowledge, or experience in air pollution control. In some agencies, for example, engineering positions budgeted for the air pollution program required only that the incumbent have had experience in one or more phases of public health engineering, including water supply, sanitary systems design and operation, safety inspection, and industrial hygiene engineering.

Tables 17 and 18 summarize the minimum education and experience requirements for selected job categories in air pollution control agencies. By far most agencies reported a Bachelor's Degree as the minimum education requirements for the job categories listed in Table 17. A small number reported requiring a Master's Degree for some job classes and a handful of agencies reported no degree requirement for certain job categorims.

TABLE 17

EDUCATION REQUIREMENTS OF SELECTED AIR POLLUTION CONTROL JOB CATEGORIES

Job Category	Number of Agencies Reporting The Following Education Requirements: No Degree[1]	Bachelors Degree	Bachelors Degree Plus Some Graduate Study	Masters Degree
Engineers				
Senior	5[a]	52	2	5
Intermediate	1	31	0	2
Junior	3	44	0	1
Chemists				
Senior	0	23	2	3
Junior	1	46	1	0
Meteorologists	0	7	3	0
Statisticians	1	4	3	0
Other Scientists	1[b]	20	0	4
Technicians	43[c]	2	0	0

1/ Some agencies required a minimum of several years of college and/or an Associate of Arts Degree for certain positions

a/ Professional Engineers License plus considerable experience normally required in lien of college degree

b/ Several years of college normally required

c/ Several years of college or trade school frequently required

TABLE 18

EXPERIENCE REQUIREMENTS FOR SELECTED JOB CATEGORIES IN AIR POLLUTION CONTROL AGENCIES

Job Category	No. of Agencies Reporting	Number of Years Experience Required [1]			
		Median	Mean	Min.	Max.
Engineers					
Senior	66	5.0	4.8	0	13
Intermediate	39	3.0	3.3	0	7
Junior	46	1.0	1.5	0	6
Chemists					
Senior	28	3.0	3.6	2	12
Junior	39	1.0	1.4	0	5
Meteorologists	9	3.0	2.4	1	5
Statisticians	7	3.0	2.4	1	5
Other Scientists	21	3.0	3.0	0	6
Technicians	43	2.0	2.3	0	6

---

[1] Additional education was substitutable for experience, usually limited to a maximum of two years. Some agencies would accept additional education in lieu of all experience requirements for certain job classes.

Usually, however, considerable experience and/or a state professional license in the appropriate field was required where no degree was required.

Almost all agencies reported some experience requirements for each job category listed. Generally, the lower the formal education requirements, the greater the experience requirements. For example, junior level engineers and chemists positions required only one year of work experience, but junior level technicians and inspector's positions (no degree required) usually required several years work experience.

6. Recruitment Problems

The rapid expansion of air pollution control activities by both State and local governments within the past three years has created the need for additional engineering, scientific, technical, and administrative personnel. These agencies must compete with industry, research institutions, educational institutions and a host of government agencies for such personnel. As seen in Section 4, air pollution control agencies, like most other government agencies, are at a serious competitive disadvantage with industry in the salaries they can offer, particularly at the more advanced levels of job responsibility. Consequently, control agencies have not, on the whole, succeeded in meeting even their minimum requirements for trained manpower.

This inability to attract sufficient numbers of qualified personnel is reflected in the vacancy figures in Table 5. It should also be noted that subsequent to this survey a number of States and local jurisdictions have enacted new air pollution control legislation providing for an expansion of control program efforts, including budget increases and additional personnel. Hence, the vacancy figures shown in Table 5 are probably on the conservative side.

As a means of obtaining a clearer picture of the recruitment problems of control agencies, program directors were asked to list, in descending order, the three classes of positions which, in their opinion, were most difficult to fill. The results are summarized in Table 20. Both State and local program directors listed engineers' positions more than twice as frequently as the next class, chemists' positions. Other classes listed by State program directors in order of frequency were technicians, miscellaneous categories, sanitarians, meteorologists, inspectors and statisticians, and other sciences. Other classes listed by local program directors in order of frequency were sanitarians, technicians, inspectors, miscellaneous categories, meteorologists, and other sciences.

If the priorities in Table 20 are assigned arbitrary weights, the relative degree of difficulty in filling the various classes of positions for control agencies generally can be expressed as the sum of the products of the priority weights and the frequency of response for each class of position. The results shown in Table 21 suggest that engineers' positions are, on the whole, far more difficult to fill than any other class of position for both State and local agencies. Chemists' and technicians' positions appear to be the second and third most critical classes respectively for both State and local agencies. Local agencies on the whole indicate that sanitarians are the fourth most critical class, followed by meteorologists and statisticians. In general, these latter positions appear to have low priority for both State and local control agencies. There are significant differences among individual agencies, however, and it should be kept in mind that only very gross figures have been presented here.

TABLE 20

Classes of Positions Most Difficult to Fill

Opinion of Air Pollution Control Program Directors

Type of Position	Priority						Total	
	1		2		3			
	State	Local	State	Local	State	Local	State	Local
Engineers	25	53	3	8	1	5	29	66
Chemists	2	10	13	13	2	8	17	31
Meteoroligists	2	1	0	2	2	1	4	4
Statisticians	1	0	1	0	1	0	3	0
Other Sciences	0	0	0	3	1	0	1	3
Inspectors	0	4	1	5	2	8	3	17
Technicians	2	8	4	10	5	13	11	21
nitarians	0	7	4	12	1	3	5	22

TABLE 21
Classes of Positions Most Difficult To Fill

Opinion of Air Pollution
Control Program Directors

Type Of Position	Weighted Priority* 1 State	Weighted Priority* 1 Local	2 State	2 Local	3 State	3 Local	Total Points State	Total Points Local
Engineers	75	159	6	16	1	5	82	180
Chemists	6	30	26	26	2	8	34	64
Meteorologists	6	3	0	4	2	1	8	8
Statisticians	3	0	2	0	1	0	6	0
Other Sciences	0	0	0	6	1	0	1	6
Inspectors	0	12	2	10	2	8	4	30
Technicians	6	24	8	20	5	13	19	57
Sanitarians	0	21	8	24	1	3	9	48

Priorities assigned following values:

Priority 1 - 3 points
" 2 - 2 points
" 3 - 1 point

Program directors were also asked to identify the major obstacles to the recruitment and retention of qualified personnel. A significant number of agencies (30) listed the overall shortage of trained manpower as the primary obstacle. However, most directors correctly interpreted the question as relating only to those deficiencies within their own programs which impeded the recruitment and retention of personnel, and not external conditions over which they had little or no control.

Table 22 summarizes the responses of 178 program directors concerning the relative importance of four types of program deficiencies: (1) insufficient salary, (2) insufficient job security, (3) insufficient advancement possibilities, and (4) restrictive residence requirements. The program deficiencies listed in order of descending frequency by both State and local program directors were: (1), (3), (4), and (2). Table 23 shows the results of assigning arbitrary weights to priorities 1 through 4 and multiplying these values by the frequency of response for each program deficiency. The total number of points represents the relative importance of each type of program deficiency in the collective opinion of program directors.

TABLE 22

Program Deficiencies Which Hinder the Recruitment and Retention of Qualified Air Pollution Control Personnel

Opinions of Air Pollution Control Program Directors

Program Deficiency	Priority and Frequency					Total
	1	2	3	4		
Insufficient salary						
State agencies	18	6	0	0		24
Local agencies	69	15	0	1		85
Insufficient job security						
State agencies	0	2	2	2		6
Local agencies	3	7	6	9		25
Insufficient advancement possibilities						
State agencies	2	6	5	1		14
Local agencies	7	33	10	2		52
Restrictive residence requirements						
State agencies	0	0	5	4		9
Local agencies	1	9	13	2		25

TABLE 23

PROGRAM DEFICIENCIES WHICH HINDER THE RECRUITMENT AND RETENTION OF QUALIFIED AIR POLLUTION CONTROL PERSONNAL

	Weighted Priority				
	1 (4 points)	2 (3 points)	3 (2 points)	4 (1 point)	Total
Insufficient salary	348	63	0	1	412
State agencies	72	18	0	0	90
Local agencies	276	45	0	1	322
Insufficient job security	12	27	16	11	66
State agencies	0	6	4	2	12
Local agencies	12	21	12	9	54
Insufficient advancement possibilities	36	117	30	3	186
State agencies	8	18	10	1	37
Local agencies	28	99	20	2	149
Restrictive residence requirements	4	27	36	7	74
State agencies	0	0	10	4	14
Local agencies	4	27	26	3	60

7. Employee Training Policies and Priorities

Most air pollution control agencies will not be able to build up adequate and effective staffs through outside recruitment of experienced personnel alone, simply because the overall demand exceeds the supply of such personnel. A second approach to developing an effective staff is through employee training and internal promotion policies. In fact, this is the approach that many agencies have taken in the development of their control programs. Therefore, an agency's employee training and career development policy is generally an important factor in its ability to satisfy its manpower requirements.

Table 24 summarizes the responses of program directors to questions concerning the air pollution training policies and programs of their agencies. A total of 115 directors indicated that their agency had an established training policy which applied to air pollution control personnel. Twenty-nine of the 34 State programs reporting had such a policy, but only 86 of the 136 local programs reporting had an established policy.

Program directors were requested to indicate the kind of training authorized under their agency's policy. Of the 29 State program directors responding, six said their policy "required", nineteen, their policy "encouraged", and four, their policy "permitted" outside-agency training in some phase of air pollution control. Of the 86 local agencies, 14 had policies which "required", 52 policies which "encouraged", and 18 policies which "permitted" employees to enroll in some type of outside-agency training in air pollution. It is evident that the large majority of control agencies let the individual employee decide whether or not he will participate in job-related training activities outside the agency.

With respect to in-agency training, 9 State agencies indicated they "required" employees to take such training, while 7 State agencies "encouraged" such participation. Thirteen State agencies did not respond to this question. Thirty-three local agencies required their personnel to enroll in in-agency training courses which 21 encouraged and sever permitted such participation. A total of fifty-nine agencies, 16 State and 43 local, reported that they provided some type of in-agency training specifically in air pollution control.

Program directors were asked to indicate what criteria they used in selecting employees for training. The most frequent consideration indicated was job category, followed by the desire and interest shown by the employee, job performance, and senority. It appears that on the whole those agencies which do have established training policies do not give much importance to senority relative to other considerations in selecting employeesfor training.

Financing the training courses is probably the most important aspect of any agency's training policy. Directors were asked to indicate the types of training activities which were paid for in whole or part by their agency. Ninety-four directors indicated that their agency paid for all or part of the costs of short-term full-time training, providing leave with full pay to the employee. Thirty-eight agencies paid all or part of the costs for short-term, part-time or evening training, and thirty-one agencies paid or supported part time or evening training on a long-term basis. Twenty-eight agencies indicated that they paid all or part of the costs of full-time training on a long-term basis providing the employee leave with full pay. Generally, agencies indicated that they paid 100% of the training costs, but most agencies did not pay for any of the travel costs associated with part-time or evening training.

TABLE 24

Summary of Training Policies and Programs of Air Pollution Control Agencies

1. Number of agencies reporting an established training policy which applies to professional and technical personnel in air pollution control work:

State agencies:	29
Local agencies:	86
Total	115

2. Type of employee training authorized

a. Outside-agency training is:

	Required	Encouraged	Permitted	Not Provided For	No Answer
State agencies	6	19	4	0	0
Local agencies	14	52	18	2	0
Total	20	71	22	2	0

b. In-agency training is:

	Required	Encouraged	Permitted	Not Provided For	No Answer
State agencies	9	7	0	0	13
Local agencies	33	21	7	9	16
Total	42	28	7	9	29

c. Number of agencies reporting some type of in-agency training program or activity specifically for air pollution control personnel:

State agencies:	16
Local agencies:	43
	59

3. Criteria for selecting personnel for agency financed or supported training programs:

	Seniority	Employee Desire and Interest	Job Category	Job Performance	Other
State agencies	10	19	18	5	4
Local agencies	11	55	49	26	8
Total	21	74	67	31	12

CONTINUATION of Summary of Training Policies and Programs of Air Pollution Control Agencies

4. Type of training paid for in whole or part by agency

	State Agencies	Local Agencies	Total
a. Long-term, full-time training leave with pay	17	11	28
b. Long-term, full-time training, leave without pay	6	5	11
c. Long-term, part-time or evening	10	21	31
d. Short-term, full-time training, leave with pay	28	66	94
e. Short-term, full-time training, leave without pay	2	9	11
f. Short-term, part-time, or evening	10	28	38
g. Other	3	6	9

Program directors were asked to indicate their agencies' priority training needs from a list of ten subject areas. Tables 25 and 26 summarize the responses by State and local program directors respectively. The subject areas listed most frequently (30 each) by State program directors were: stationary source design and testing and regulation and enforcement procedures. Local program directors also listed regulation and enforcement procedures most frequently, followed by analytical chemistry and meteorology.

In Tables 27 and 28 the priorities were assigned arbitrary values of 10 through 1 and then multiplied by the frequencies of response shown in Tables 25 and 26. The sum of the products represents the relative priority among subject areas for State and local agencies generally. State agencies on the whole appear to have the greatest training needs in the areas of process evaluation, regulation and enforcement procedures, and stationary source design and testing. Other important areas are design of emission reduction plans, analytical chemistry, and data processing. Local agencies generally appear to have the highest priority training needs in the areas of regulation and enforcement procedures, analytical chemistry, and stationary source design and testing. Other important areas include process evaluation, design of emission reduction plans, and meteorology.

TABLE 25

State Air Pollution Control Agency Training Needs

Opinions of Program Directors

Subject Area	Frequency and Priority 1	2	3	4	5	6	7	8	9	10	Total
Analytical Chemistry	7	3	1	1	6	4	2	1	2	0	27
Stationary Source Design and Testing	5	6	6	6	2	0	1	1	2	1	30
Process Evaluation	7	7	5	4	1	2	2	0	0	0	28
Meteorology	0	4	3	5	4	3	2	2	1	0	24
Design of Emission Reduction Plans	4	3	7	2	3	4	0	2	2	0	27
Regulation and Enforcement Procedures	9	2	5	4	2	3	5	0	0	0	30
General Management and Administration	2	6	1	2	1	1	5	1	4	0	23
Data Processing	3	4	5	2	3	5	0	2	1	0	25
Public Information	0	4	2	2	4	1	1	8	2	0	24
Other	1	0	0	0	0	0	0	0	0	0	1

TABLE 26

Training Needs of Local Air Pollution Control Programs

Opinions of Regional Representatives

Subject Area	Frequency and Priority										Total
	1	2	3	4	5	6	7	8	9	10	
Analytical Chemistry	26	15	10	9	5	8	3	3	6	0	85
Stationary Source Design and Testing	20	19	10	8	5	8	3	3	2	0	78
Process Evaluation	15	18	21	4	7	3	4	3	1	0	76
Meteorology	7	7	17	8	13	5	13	5	3	1	79
Design of Emission Reduction Plans	14	14	10	16	6	2	4	4	1	0	71
Regulation and Enforcement Procedures	26	17	15	7	6	8	2	5	0	0	86
General Management and Administration	11	11	9	9	3	10	5	6	4	0	68
Data Processing	9	9	12	5	9	7	5	6	9	0	71
Public Information	9	9	9	8	8	2	8	8	15	0	76
Other	3	0	0	1	1	1	1	0	0	0	7

TABLE 27
State Air Pollution Control Agency Training Needs

Opinions of Regional Representatives

Subject Area	Weighted Priority*										
	1	2	3	4	5	6	7	8	9	10	Total
Analytical Chemistry	70	27	8	7	36	20	8	3	4	0	183
Stationary Source Design and Testing	50	54	48	42	12	0	4	3	4	1	218
Process Evaluation	70	63	40	28	6	10	8	0	0	0	225
Meteorology	0	36	24	35	24	15	8	6	2	0	150
Design of Emission Reduction Plans	40	27	56	14	18	20	0	6	4	0	185
ulation and Enforcement Procedures	90	18	40	28	12	15	20	0	0	0	223
General Management and Administration	20	54	8	14	6	5	20	3	8	0	138
Data Processing	30	36	40	14	18	25	0	6	2	0	171
Public Information	0	36	16	14	24	5	4	24	4	0	127
Other	10	0	0	0	0	0	0	0	0	0	10

*Priorities assigned following values:

Priority 1 = 10 points
" 2 = 9 "
" 3 = 8 "
" 4 = 7 "
" 5 = 6 "
" 6 = 5 "
" 7 = 4 "
" 8 = 3 "
" 9 = 2 "
" 10 = 1 point

TABLE 28

Training Needs of Local Air Pollution Control Agencies

Opinions of Program Directors

Subject Area	Weighted Priority*										
	1	2	3	4	5	6	7	8	9	10	Total
Analytical Chemistry	260	135	80	63	30	40	12	9	12	0	641
Stationary Source Design and Testing	200	171	80	56	30	40	12	9	4	0	602
Process Evaluation	150	162	168	28	42	15	16	9	2	0	592
Meteorology	70	63	136	56	78	25	52	15	6	1	502
Design of Emission Reduction Plans	140	126	80	112	36	10	16	12	2	0	534
Regulation and Enforcement Procedure	260	153	120	49	36	40	8	15	0	0	681
General Management and Administration	110	99	72	63	18	50	20	18	8	0	458
Data Processing	90	81	96	35	54	35	20	18	18	0	447
Public Information	90	81	72	56	48	10	32	24	30	0	443
Other											

*Priorities assigned following values:

Priority 1 - 10 points
" 2 - 9 points
" 3 - 8 points
" 4 - 7 points
" 5 - 6 points

Priority 6 - 5 points
" 7 - 4 points
" 8 - 3 points
" 9 - 2 points
" 10 - 1 point

Footnotes

1/ Jean J. Schueneman, "Air Pollution Problems and Control Programs in the United States", Journal of the Air Pollution Control Association, March, 1963, p. 120.

2/ Ibid, pp. 121-22.

3/ Charles D. Yaffe, "A Roll Call of the States -- Where Do We Stand in State and Local Air Pollution Control?" Proceedings of the National Conference on Air Pollution, December 12-14, 1966, Washington, D.C., p. 360.

4/ It is estimated that there were 1600 positions in air pollution control agencies in 1965. Since the ratio of full-time to part-time positions is about 8 to 2, there were probably about 1280 full-time and 320 part-time positions in 1965.See Jean J. Schueneman, "A Roll Call of the Communities -- Where Do We Stand in Local or Regional Air Pollution Control?" Proceedings of the National Conference on Air Pollution, December 12-14, Washington, D. C., p.397.

5/ National Science Foundation "Scientific and Technical Manpower Resources" (NSF 64 - 28), 1964, p. 40.

6/ Ibid, p. 43

7/ Ibid, p. 41

8/ National Center for Health Statistics, U.S. Public Health Service, "Health Resources Statistics, 1965", p. 65.

9/ National Science Foundation, Op. Cit., p. 107.

10/ National Science Foundation, "American Scientific Manpower, 1964" (NSF 66 - 29), p. 118.

11/ Bureau of Labor Statistics, United States Department of Labor, "National Survey of Professional, Administrative, Technical, and Clerical Pay", Bulletin No. 1535, October 1966, p. 29.

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1. Schueneman, Jean J. "Air Pollution Problems and Control Programs in the United States", Journal of the Air Pollution Control Association, March 1963, p. 120.

2. Yaffe, Charles D., "A Roll Call of the States -- Where Do We Stand in State and Local Air Pollution Control?" Proceedings of the National Conference on Air Pollution, December 12-14, 1966, Washington, D.C., p. 360.

3. National Science Foundation "Scientific and Technical Manpower Resources" (NSF 64 - 28), 1964, p. 40.

4. National Center for Health Statistics, U.S. Public Health Service, "Health Resources Statistics, 1965", p. 65.

5. National Science Foundation, "American Scientific Manpower, 1964" (NSF 66 - 29), p. 118.

6. Bureau of Labor Statistics, United States Department of Labor, "National Survey of Professional, Administrative, Technical, and Clerical Pay", Bulletin No. 1535, October 1966, p. 29.

APPENDIX B:
STANDARDIZED JOB
CLASSES FOR
AIR POLLUTION CONTROL
PERSONNEL

AIR POLLUTION CONTROL ENGINEER

The Air Pollution Control Engineer performs professional level work involving the application of engineering principles and techniques in the analysis, evaluation, control, and prevention of air pollution. His duties may include one or more of the following:

1. Planning, directing and conducting periodic inspection and testing of facilities including process evaluation and emission testing.
2. Planning, directing and conducting investigations of specific air pollution problems and recommending appropriate remedial action.
3. Rendering technical assistance and consultation to builders and operators of facilities.
4. Reviewing plans and specifications for approval and certification of proposed new installations and modifications to existing installations.
5. Planning, directing and conducting an air monitoring program including the analysis, evaluation and interpretation of air quality data.
6. Planning, directing, and conducting an inventory of emission sources.
7. Planning, directing, and conducting engineering studies concerning the testing, evaluation, and certification of methods and devices for controlling emissions for motor vehicles.
8. Developing emission and air quality standards.
9. Planning and developing all or part of the air pollution control program including the annual budget, personnel recruitment and training, administrative procedures, and organization.

10. Attending and participating in meetings and conferences of professional, industrial, and civic groups on air pollution and related environmental health topics.

The Air Pollution Control Engineer employed in a highly professionalized moderate - to large sized program may work at one of several fairly distinct levels of responsibility. The senior APC Engineer may be in charge of the entire program or a major program component such as a large branch or section. He directs and supervises other professional engineers and scientists and technical personnel in one or more phases of the program. He may also personally perform the more difficult and complex engineering studies, investigations, and evaluations.

The Intermediate APC Engineer works, supervises and conducts difficult engineering work in a major phase of the control program. He may conduct studies, research, and investigations independently but under the general direction of a Senior APC Engineer or Scientist, or he may be in charge of a small branch or section with operational responsibilities. He supervises and works with other professional engineers and scientists as well as sub-professional technical personnel.

The Junior APC Engineer performs beginning to moderate level professional engineering duties under the direction and supervision of a senior or intermediate level engineer or scientist. He may have some supervising responsibility in a small section or unit of the agency or work independently on assigned studies and investigations.

The Air Pollution Control Engineer has at least a Bachelor's Degree in engineering and/or a state professional engineer's license issued on basis of an examination requiring substantial professional level engineering experience. In addition to the degree or license, professional level experience in air pollution control or a related field is normally required for the senior and intermediate level positions. Junior level positions normally require only minimal or no work experience. Training beyond the B.S. Degree may be substituted for experience to some extent.

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AIR POLLUTION CONTROL CHEMIST

The Air Pollution Control Chemist performs professional level work involving the application of the principles and techniques of analytical and quantative chemistry in the measurement, analysis, and evaluation of air pollution and its effects. His duties may include one or more of the following:

1. Directing, supervising and conducting the qualitative and quantative analysis of air samples for possible physiologically active compounds.
2. Planning, developing, and operating a system of air monitoring stations
3. Directing and conducting studies and investigations on atmospheric chemical phenomena such as smog formation.
4. Testing and evaluating methods and equipment used in the measurement and analysis of air pollution.
5. Evaluation of the contribution of specific sources and classes of sources to the overall air pollution problem.
6. Supervising and conducting the investigation of specific air pollution sources, including the collection of stack emission gas samples, process evaluation, and ambient air sampling.
7. Supervising and conducting qualitative analyses of fuel samples to determine conformance to standards.

The Air Pollution Control Chemist employed in a highly professionalized moderate-to-large sized program may work at one of two general levels of responsibility. The Senior APC Chemist directs and supervises the work of other professional chemists in conducting research, studies, and routine chemical analysis of one or more air pollutants. He may prescribe the methods and techniques to be employed in making the analyses. He also personally performs the more difficult research work and chemical analyses. He may develop new analytical procedures.

The Senior APC Chemist is normally in charge of a small section or unit concerned with air pollution and related environmental problems. His other duties may include the recruitment, training, and evaluation of employees, developing program plans relating to the chemical analysis of air pollution, preparing budget and administrative reports and consulting with pollutors, pollutions control experts, profession and scientific groups and civic groups on general and specific air pollution porblems.

The Junior Air Pollution Control Chemist conducts special and routine chemical analyses of air samples using standardized methods and procedures. He works under the direction and supervision of a Senior APC Chemist, with some latitude for independent action in the solution of a particular problem. He may supervise sub-professional personnel in the preparation of chemical reagents and the operation and maintenance of laboratory equipment.

The Air Pollution Control Chemist has at least a Bachelor's Degree with a major in chemistry. He may be required to have considerable post-graduate training and experience in analytical, quantative, or physical chemistry depending on his level of responsibility and his particular duties.

AIR POLLUTION CONTROL METEOROLOGIST

The Air Pollution Control Meteorologist performs professional level work involving the application of meteorological theory, forecasting methods and weather data in the analysis of the behavior of atmospheric pollutants under varying conditions. His work may also involve basic research relating to methods for predicting the behavior of pollutants in the atmosphere including the development of micro-meteorological diffusion models. His duties may include one or more of the following:

1. Directing, supervising and performing pollutant-diffusion studies including the development and testing of meteoroligient diffusion models.
2. Preparing periodic forecasts of air pollution-potential conditions
3. Analyzing and correlating meteorological factors with pollution movement and concentration
4. Collecting, analyzing, and interpeting weather data obtained from state and federal agencies
5. Advising air pollution engineers concerning the effects of meteorological factors on the dispersion of pollutants from general and specific sources
6. Supervising and performing calibration and operation of meteorological instruments and equipment
7. Consulting with local, state and federal air pollution control agencies on the development of comprehensive pollution potential forecasting systems

The Air Pollution Control Meteorologist may work independently or

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within a small section or unit under the general direction of a senior or intermediate level engineer or scientist. He may exercise technical supervision over a small number of professional and technical sub-profession employs engaged in studies and investigations.

He normally has at least a Bachelors Degree with a major in meteorology. He may be required to have several years experience as a practicing meteorologist. In most cases post graduate training may be substituted for experience to some extent.

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AIR POLLUTION CONTROL STATISTICIAN

The Air Pollution Control Statistician performs professional level work involving the application of statistical theory, methods, and techniques to the analysis of a variety of air pollution and related data. His duties may include one or more of the following:

1. Supervising, directing and performing the compilation, analysis and reduction of air sampling and meteorological data including tests for significance, reliability, and multiple correlations.
2. Supervising, directing and performing statistical studies to determine possible relationships between air pollution and health effects.
3. Plans and participates in the development and operation of automatic data storage and retrevial systems.
4. Supervises and directs clerical personnel in the preparation of scientific and program management data for use in AOP systems.

The Air Pollution Control Statistican normally has at least a Bachelor's Degree with a minimum of 15 hours in mathematics or statistics and several years of experience in air pollution or related area.

AIR POLLUTION CONTROL SCIENTIST

The Air Pollution Control Engineer refers to a very general category of personnel which have had professional level training in one or more of the follwoing disciplines: physics, mathematics, biology, chemistry, and engineering. The responsibilities of the Air Pollution Control Scientist primarily involve the practical application of scientific and engineering principles to the solution of real problems of air pollution measurement, analysis, evaluation, and control.

Only a few control agencies, most of them are located in California, employ scientists in the capacity of theoritical or developmemtal researchers. The category is used here primarily because it is a convenient way to classify a wide variety of positions which have official qualifications requirements which either definitely identify them as non-engineering(eg. air pollution physicist)or are so generally defined that it is impossible to classify them as engineering positions with any confidence. For example, a number of agencies have the job class title of "Air Pollution Control Engineer" but the qualifications-requirement permits the person holding the position to have a degree in physics or chemistry in lien of a degree in engineering. Hence this type position does not meet the criteria of Air Pollution Control Engineer established earlier even though the individual holding the position may have the qualifications to be an Air Pollution Control Engineer.

The duties and responsibilities of the Air Pollution Control Scientist vary widely with the particular agency and the professional training required for the position. He may have responsibility for supervising and conducting air quality studies involving the collection analysis, and evaluation of air samples and the correlation of this data with source location patterns, transportation patterns, and weather parameters. He may perform work indistinguishable from the air pollution control engineer including the review and evaluation of plans and specifications for facilities and control equipment, the inspection of such facilities, and developing recommendations for air quality and emission standards.

In a few of the larger agencies the Air Pollution Control Scientist may direct, supervise, and conduct complex studies and investigations into the behavior of specific pollutants in the atmosphere and the effects-individual and synergistic-of pollutants on physical and biological systems. In the smaller agencies he is usually responsible for performing routine laboratory analyses of air samples or administrative and engineering work related to the surviellance and compliance phases of his agency's program.

The Air Pollution Control Scientist has at least a Bachelors Degree in the physical or life sciences or in engineering. Research and high-level supervisory positions normally require a graduate degree or equivalent work experience.

AIR POLLUTION CONTROL SANITARIAN

The Air Pollution Control Sanitarian performs professional and sub professional work in air pollution control within the context of a public health agency. His duties and responsibilities vary widely with the particular agency and phase of the control program. The Air Pollution Control Sanitarian's duties are frequently indistinguishable from those of the Air Pollution Control Inspector. In many agencies he works in the surviellance and compliance phases of his agency's program, supervising and conducting routine field observations and facilities inspection. He may supervise and participate in special investigations of particular air pollution problems, measuring and analyzing pollutants and evaluating their effects on specific receptors.

The Air Pollution Control Sanitarian may also supervise and conduct routine air sampling and analysis activities and participate in air quality evaluation studies. At the higher level positions, he may have responsibility for planning and directing the compliance phase of his agency's control program. This responsibility may include the direction and supervision of other sanitarians and inspectors.

The Air Pollution Control Sanitarian is normally a professional level position requiring at least a Bachelor's Degree with specialized training in the physical or life sciences, usually chemistry or biology. In addition some agencies require graduate training and/or a Master's of Public Health for the higher positions.

The Air Pollution Control Sanitarian category also includes sub professional positions requiring several years of college education with courses in the physical or life sciences. These positions are quite similar to that of Air Pollution Control Inspector in terms of duties and responsibilities.

AIR POLLUTION CONTROL INSPECTOR

The Air Pollution Conrtol Inspector performs technical and administrative work in the surviellance and compliance phases of the air pollution control program. His required technical duties are normally at the sub professional level but his overall responsibility may require considerable ability in directing and supervising his agency's compliance program and in dealing effectively with the public. His duties may include one or more of the following:

1. Inspects the design, construction, and operation of fuel burning and processing equipment to determine compliance with regulations and to recommend necessary changes to achieve compliance and prevent possible future violations
2. Investigates complaints to determine if violations have occurred; interviews complainants; determines source and cause of pollution; confers with violators and insures that existing laws and regulations are made known; issues warnings and violation notices; prepares evidence and testifies in court
3. Conducts regular surviellance of facilities within a specified area; makes observations of and measurements of visible emmissions to determine if violation of regulation is occurring
4. Conducts source sampling activities requiring ability to operate electrical and mechanical sampling equipment; collects samples of stack effluents and fuels

5. Conducts and participates in hearings for violators of air pollution regulations
6. Prepares reports on investigations of particular sources, recurring pollution problems, and the need for improvement of existing control and enforcement procedures and regulations

The Senior Air Pollution Control Inspector normally directs and/or supervises the surviellance and enforcement activities of a large to medium sized branch or section. He may have inspectors, technicians, and occasionally junior-level engineers within his unit.

He may be responsible for assigning and evaluating the work of subordinates, supervising and participating in staff training activities and developing the overall enforcement program of his agency. He personally performs the more complex and difficult investigations and attempts to secure compliance from violators in difficult cases. He supervises and participates in routine surviellance and inspectional procedures.

The Junior Air Pollution Control Inspector works under general supervision. He normally does not have any supervisory responsibilities. He handles the less difficult air pollution problems. He normally inspects and evaluates the smaller and less complex fuel burning and processing equipment.

The Air Pollution Control Inspector is normally not required to have a college degree, although in the larger agencies is considered desirable, especially at the higher levels of responsibility. Most agencies do require prior experience and/or training in the design, construction, and operation of fuel burning and processing equipment and in air pollution control equipment. Considerable experience is normally required for the higher level suspectoral positions.

AIR POLLUTION CONTROL TECHNICIAN

The Air Pollution Control Technician performs sub professional technical work in either the laboratory or field in those aspects of his agency's program related to the measurement, analysis and evaluation of air quality pollutants from various sources. He may be essentially a laboratory technician responsible for the operation and maintenance of equipment used in chemical or spectroscopic analysis of air samples. He may be required to construct, operate, and maintain electro-mechanical devices used in air sampling stations in the field.

The Air Pollution Control Technician normally works under the direction and supervision of an engineer, chemist or other scientist. He normally does not have supervisory responsibilities, although he may exercize some degree of technical supervision over field inspectors in the operation of air sampling and source sampling equipment.

The Air Pollution Control Technician is frequently required to have two years of college training with courses in physics or electrical or mechanical engineering considered to be desirable. Many agencies, however, require no formal training beyond a high school degree but do require at least several years experience in operating and maintaining electrical and mechanical measurement devices.

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CHEMISTS AND ENGINEERS

CHEMIST

Performs research, development, interpretive, and analytical work to determine the composition, molecular structure, and properties of substances, to develop or investigate new materials and processes, and to investigate the transformation which substances undergo. Work typically requires a B.S. degree in chemistry or equivalent in education and experience combined.

Chemist I

General characteristics. As the beginning level of professional work in chemistry, a bachelor's degree with major study in chemistry, or equivalent is required. Typically receives formal classroom or on-the-job training.

Direction received. Performs work under close supervision with specific and detailed instructions as to required tasks and results expected.

Typical duties and responsibilities. Assignments are planned to provide experience in the application of common laboratory techniques and familiarization with methods and practices in the laboratory. Performs a variety of routine analyses, tests, and operations, and assists experienced chemists by carrying out detailed steps of experiments.

Responsibility for the direction of others. None.

Chemist II

General characteristics. At this continuing developmental level for professional chemists, work is characterized by selection and application of general and specialized methods, techniques, and instruments commonly used in the laboratory. May receive advanced on-the-job training or formal classroom instruction.

Direction received. Supervisors establish the nature and extent of analysis required, specify methods and criteria on new types of assignments, and review work for thoroughness of application of methods and accuracy of results.

Typical duties and responsibilities. Analyzes a wide variety of samples for which there are standard or established methods of analysis or for which the adaptation of standard methods is obvious or determined by others. Conducts specified phases of research projects as an assistant to an experienced chemist.

Responsibility for the direction of others. May supervise a few technicians or aids.

Chemist III

General characteristics. Performs work requiring application of knowledge of a specialized field of chemistry and ingenuity in the independent evaluation, selection, and adaptation of standard methods and techniques.

Direction received. On routine work, supervision is very general; unusual problems are resolved with close collaboration of supervisor. Completed work is reviewed for application of sound judgment in choice of methods and adequacy of results.

Typical duties and responsibilities. Develops details of research and development assignments in accordance with a line of approach suggested by the supervisor and adapts methods to the specific requirements of assignments. Analyzes samples that require specialized training because standard methods are unapplicable, because of required interpretive judgment of quality of substances, or because of required specialized skill in adapting techniques such as microanalysis.

Responsibility for the direction of others. May supervise a few technicians or aids.

CHEMIST—Continued

Chemist IV

General characteristics. Plans and conducts work in chemistry requiring mastery of specialized techniques or considerable ingenuity in selecting and evaluating approaches to unforeseen or novel problems.

Direction received. Generally works independently of technical supervision but refers proposed plans and unusually important or complex problems to supervisor for guidance.

Typical duties and responsibilities. Conducts research assignments requiring the evaluation of alternate methods of approach. Undertakes the more complex, and exacting, or esoteric analytical assignments requiring a specialist in technique or product. Prepares interpretive reports of results and may provide technical advice on significance of results.

Responsibility for the direction of others. May supervise a small staff of chemists and technicians.

Chemist V

General characteristics. Participates in planning research programs on the basis of specialized knowledge of problems and methods and probable value of results. May serve as an expert in a narrow specialty making recommendations and conclusions which serve as the basis for undertaking or rejecting important projects.

Direction received. Usually discusses important developments with supervisor. Supervision received relates largely to work objectives and administrative aspects.

Typical duties and responsibilities. From broad program objectives, plans, organizes, and supervises or conducts research investigations with responsibility for defining projects and scope and independently selecting lines of approach.

As individual worker, carries out research project requiring origination of new scientific techniques and mature background of knowledge of related fields of science.

Responsibility for the direction of others. May supervise a small group of chemists engaged in varied research projects or a larger group on routine analytical work.

Chemist VI

General characteristics. Performs work requiring leadership and expert knowledge in a specialized field of chemistry. Conceives, plans, and directs projects of a pioneering nature to create new methods and techniques or to resolve problems which have proved unusually refractory.

Direction received. Supervision received is essentially administrative with assignments broadly indicated in terms of objectives.

Typical duties and responsibilities. Determines the kind of projects and data needed to meet objectives of programs. Maintains liaison with related organizations and represents the laboratory in important conferences with authority to commit the organization. May serve as a consultant to other chemists in the specialty field.

Responsibility for the direction of others. May plan, organize, direct, and evaluate the work of a group of chemists.

Chemist VII

General characteristics. Supervisor—provides leadership and scientific guidance for a broad and diversified program in chemistry and related supporting activities such as to require several subordinate supervisors responsible for programs typically identified with level VI. Recommends the facilities, personnel, and funds required to carry out programs and evaluates accomplishments.

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continued

ual researcher and consultant—is a nonsupervisory chemist recognized status and authoritativeness in his company, in a broad area of specialization consulted extensively by associates and others with a high degree of reliance his scientific interpretations and advice.

Direction received. Under general administrative direction.

Typical duties and responsibilities. Supervisor—is responsible for an important segment of a chemical program of a company with extensive and diversified scientific requirements or the entire chemical program of a company where the program is limited in scope. Makes authoritative technical recommendations concerning the scientific objectives and levels of work which will be most profitable in the light of company requirements and scientific and industrial trends and developments.

Individual researcher and consultant—selects problems for research and conceives and plans investigations in which the phenomena and principles are not adequately understood, so that outstanding creativity and mature judgment are required to devise hypotheses and techniques of experimentation and to interpret results. Advises the head of a large laboratory on complex aspects of extremely broad and important programs with responsibility for exploring, justifying, and evaluating proposed and current programs and projects and furnishing advice on unusually complex and novel problems in the specialty field.

Responsibility for the direction of others. Supervisor—see "general characteristics" above.

Chemist VIII

General characteristics. Supervisor—provides leadership and scientific guidance for a very broad and highly diversified program in chemistry and related supporting activities requiring several subordinate supervisors responsible for programs typically identified with level VII, or a large number of supervisors of lower levels. Recommends the facilities, personnel, and funds required for programs and evaluates accomplishments.

Individual researcher and consultant—serves as a consultant to top-level management on scientific questions of far-reaching significance. Is sought as a consultant by chemists who are themselves specialists in the field. Is a nationally recognized research leader and consultant for his company.

Direction received. Receives general administrative direction.

Typical duties and responsibilities. Supervisor—is responsible for an important segment of a chemical program of a company with very extensive and highly diversified scientific requirements or the entire chemical program of a company where the program is of moderate scope. Is responsible for deciding the kind and extent of chemical and related program needed to accomplish the objectives of the company, for choosing the scientific approaches, for planning and organizing facilities and programs, and for interpreting results.

Individual researcher and consultant—formulates and guides the attack on exceptionally difficult and important problems whose solution would represent a major scientific or technological advance.

Responsibility for the direction of others. Supervisor—see "general characteristics" above.

This level does not include the chief chemist of a company wi very extensive and highly diversified program; or the assistant chemist of a company with an unusually extensive and novel chem program.

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ENGINEER

Performs work in research, development, design, testing, analysis, production, construction, maintenance, operation, planning, survey, estimating, application, or standardization of engineering facilities, systems, structures, processes, equipment devices, or materials requiring knowledge of the science and art by which materials, natural resources, and power are made useful. Work typically requires a B.S. degree in engineering or the equivalent in experience and education combined. (Safety engineers, industrial engineers, quality control engineers, and sales engineers are to be excluded.)

Engineer I

General characteristics. As the beginning level of engineering work, a bachelor's degree in engineering or equivalent is required. Typically receives formal classroom or on-the-job training.

Direction received. Performs work under close supervision with specific and detailed instructions as to required tasks and results expected. Work is checked during progress, and upon completion is reviewed for accuracy.

Typical duties and responsibilities. Performs simple tasks that are planned to provide experience and familiarization with methods and practices of the company in the specialty field and to ascertain the interests and aptitudes of the beginning engineer.

Responsibility for the direction of others. None.

Engineer II

General characteristics. At this continuing developmental level, performs routine engineering work requiring application of standard techniques, procedures, and criteria in carrying out a sequence of related engineering tasks. Limited exercise of judgment is required on details of work. May receive advanced on-the-job or classroom instructions.

Direction received. Supervisor screens assignments to eliminate difficult problems and selects techniques and procedures to be applied. Receives close supervision on new aspects of assignments.

Typical duties and responsibilities. Using prescribed methods, performs specific and limited portions of a broader assignment of an experienced engineer. Applies standard practices and techniques in specific situations, adjusts and correlates data, recognizes discrepancies in results, and follows operations through a series of related detailed steps or processes.

Responsibility for the direction of others. May supervise a few aids or technicians.

Engineer III

General characteristics. Work requires independent evaluation, selection, and application of standard engineering techniques, procedures, and criteria, using judgment and ingenuity in making minor adaptations and modifications.

Direction received. Receives instruction on specific assignment objectives, points of emphasis, reference and information sources, and possible solutions. Unusual problems are solved jointly with supervisor, and work is reviewed for application of sound engineering judgment.

Typical duties and responsibilities. Assignments include equipment design and development, test of materials, preparation of specifications, process study, research investigations, report preparation, and other activities of limited scope requiring knowledge of principles, practices, and techniques commonly employed in the specific narrow area of assignments. Performs work which involves conventional types of plans, investigations, surveys, structures, or equipment with relatively few complex features for which there are precedents.

Responsibility for the direction of others. May supervise the work of draftsmen, inspectors, and other technicians assigned to assist in the work.

Engineer—Continued

Engineer IV

General characteristics. Work requires originality and judgment in the independent evaluation, selection, and substantial adaptation and modification of standard techniques, sources, and criteria. Is recognized as fully competent in all conventional aspects of the subject-matter or functional area of assignments.

Direction received. Receives direct supervision and guidance principally on novel or controversial problems or questions. Makes independent technical decisions on details not covered by precedents.

Typical duties and responsibilities. Plans, schedules, and coordinates detailed phases of engineering work in a part of a major project or in a total project of moderate complexity. Devises new approaches to problems encountered. Performs work which involves conventional engineering practice but includes a variety of complex features such as conflicting design requirements, unsuitability of standard materials, and difficult coordination requirements. Work requires a broad knowledge of precedents in the specialty area and a good knowledge of principles and practices of related specialties.

Responsibility for the direction of others. May supervise a few engineers or technicians on routine work.

Engineer V

General characteristics. Work requires application of intensive and diversified knowledge of engineering principles and practices in broad areas of assignments and related fields. Makes decisions independently on engineering problems and methods, and represents the organization in conferences to resolve important questions and to plan and coordinate work. Positions may be supervisory or nonsupervisory.

Direction received. Receives supervision and guidance only in terms of specific work objectives and critical issues.

Typical duties and responsibilities. *Supervisor*—plans, develops, coordinates, and directs a large and important engineering project or a number of small projects with many complex features.

Nonsupervisory researcher—carries out complex or novel research assignments requiring the development of new or improved techniques and procedures.

Nonsupervisory staff specialist—develops and evaluates plans and criteria for a variety of projects and activities to be carried out by others.

Responsibility for the direction of others. *Supervisor*—supervises, coordinates, and reviews the work of a small staff of engineers and technicians. Estimates manpower needs and schedules and assigns work to meet completion date.

Engineer VI

General characteristics. Work is characterized by full technical responsibility for interpreting, organizing, executing, and coordinating assignments. Maintains liaison with other organizations or companies. Positions may be supervisory or nonsupervisory.

Direction received. Assignments are received in terms of broad general objectives and limits. Supervision concerns administrative features of the work.

Typical duties and responsibilities. Conceives and plans engineering projects involving exploration of subject area, definition of scope and selection of problems for investigation, and development of novel concepts and approaches.

Supervisor—plans, develops, coordinates, and directs a number of large and important projects or a project of major scope and importance.

Nonsupervisory researcher—plans and conducts research or other work requiring pioneering in areas in which large blocks of data are controversial or unknown.

ENGINEER—Continued

Nonsupervisory staff specialist—as an expert in a specific field performs advisory, consulting, and review work.

Responsibility for direction of others. Supervisor—directs a staff of project engineers and assistants. Evaluates progress of the staff and results obtained, and recommends major changes to achieve overall objectives.

Engineer VII

General characteristics. Work is characterized by decisions and recommendations which are recognized as authoritative and have an important impact on extensive engineering activities. Initiates and maintains extensive contacts with key engineers and officials of other organizations and companies; this requires skill in persuasion and negotiations of critical issues. Positions may be supervisory or nonsupervisory.

Direction received. Receives general administrative direction.

Typical duties and responsibilities. Demonstrates creativity, foresight, and mature engineering judgment in anticipating and solving unprecedented engineering problems, determining program objectives and requirements, organizing programs and projects, and developing standards and guides for diverse engineering activities.

Supervisor—plans, develops, coordinates, and directs an engineering program consisting of many large and important projects.

Nonsupervisory—performs advisory, consulting, and review work as authoritative specialist or expert in broad program areas.

Responsibility for the direction of others. Supervisor—directs a large staff of project engineers, and engineers and scientists in supporting functions. Several subordinate supervisors are responsible for projects or activities typically identified with level VI.

Engineer VIII

General characteristics. Work is characterized by authoritative decisions and recommendations which have a far-reaching impact on extensive engineering and related activities of the company. Negotiates critical and controversial issues with top level engineers and officers of other organizations and companies. Positions may be supervisory or nonsupervisory.

Direction received. Receives general administrative direction.

Typical duties and responsibilities. Demonstrates a high degree of creativity, foresight, and mature engineering judgment in planning, organizing, and guiding extensive engineering programs and activities of outstanding novelty and importance.

Supervisor—plans, develops, coordinates, and directs a highly complex and diversified engineering program consisting of many large and important projects and supporting activities.

Nonsupervisory—performs advisory and consulting work for the company as a nationally recognized authority for broad program areas of considerable novelty and importance.

Responsibility for the direction of others. Directs a very large staff of project engineers, and engineers and scientists in supporting functions. Several subordinate supervisors are responsible for programs, projects, or activities typically identified with level VII.

> This level does not include positions of chief engineers of companies with large engineering organizations; e.g., those engaged in research and development on a variety of complex weapons systems with numerous novel components, or of chiefs of primary organizational segments of companies with very large engineering organizations engaged in unusually extensive and diversified research and development.

APPENDIX D

AIR POLLUTION CONTROL
AGENCIES WITH BUDGETS
OF $5000 OR MORE
(FY 1967)

Agency	Population Served(1960 Census)	1967 Budget	Per Capita Budget	Positions Budgeted FT	PT
ALABAMA					
State Department of Public Health	3266.7	50.0	0.01	7	1
Birmingham Department of Inspection Services	340.9	14.7	0.04	2	0
Huntsville Air Pollution Control Board	72.4	14.7	0.20	1	1
Jefferson County Department of Health	294.0	115.5	0.39	10	5
Mobile County Board of Health	314.3	29.4	0.09	3	2
ARIZONA					
Maricopa County Health Department	663.5	135.6	0.20	11	42
Pima County	265.7	41.2	0.15	3	2
ARKANSAS					
State of Arkansas Pollution Control Commission	1786.3	58.0	0.03	11	5
CALIFORNIA					
California State Department of Health	15,717.2	1265.0	0.08	83	29
California Motor Vehicle Control Board	15,717.2	478.6		20	0
Bay Area Air Pollution Control District *	3291.1	1,148.0	0.35	75	2
Contra Costa County Health Department	409.0	19.8	0.05	0	3

* Counties-Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara

Agency	Population Served(1960 Census)	1967 Budget	Per Capita Budget	Positions Budgeted FT	PT
Humboldt-Del Norte County Health Department	104.9	22.8	0.22	1	4
Los Angeles County Air Pollution Control District	6038.8	3732.7	0.62	305	0
Monteroy County Air Pollution Control District	198.4	67.6	0.34	0	3
Orange County Air Pollution Control District	703.9	114.8	0.16	9	0
Riverside County Air Pollution Control District	306.2	86.0	0.28	8	0
Sacramento County Air Pollution Control District	502.8	31.8	0.06	2	0
San Beradino County Air Pollution Control District	503.6	328.6	0.65	18	2
San Diego County Department of Public Health	1033.0	72.5	0.07	5	0
Ventura County Health Department	199.1	30.0			
COLORADO					
Colorado Department of Public Health	1753.9	123.0	0.07	11	1
Boulder City-County Health Department	74.3	7.3		0	4
Denver City-County Health Department	493.9	191.1	0.39	17	2
Jefferson County Health Department	127.5	20.0	0.16	1	4

Agency	Population Served(1960 Census)	1967 Budget	Per Capita Budget	Positions Budgeted	
				FT	PT
Tri-County District Health Department (Adams, Arapahoe and Douglas Counties)	238.5	60.0	0.25	7	1
CONNECTICUT					
State Department of Health, Connecticut	2535.2	151.6		15	5
Bridgeport Fire Department	156.7	22.2		5	0
Fairfield Department of Health	46.2	32.4	0.70	0	3
Greenwich Health Department	53.8	25.3	0.47	0	8
Meriden Department of Health	51.8	15.0	0.29	1	3
Middletown Board of Health	33.2	19.0		3	0
Milford	41.7	23.5			
New Britain H.D.	**82.2**	**24.3**		**0**	**7**
New Haven Department of Health	152.0	56.9	0.37	4	11
Norwalk Commission On Smoke Regualtion	67.8	24.3			
Stamford Building Department	92.7	49.0			
Stratford Department of Health	45.0	31.4	0.70	1	4
DISTRICT OF COLUMBIA					
District of Columbia Public Health Department	764.0	36.7	0.05	7	8

Agency	Population Served(1960 Census)	1967 Budget	Per Capita Budget	Positions Budgeted FT	PT
FLORIDA State Board of Health	4951.6			17	0
Dade County Department of Health	935.0	131.4	0.14	15	0
Duval County Air Improvement Authority	455.4			10	0
Hillsborough County Health Department	397.8	10.0		2	3
Manatee County Health Department	62.2	55.2	0.80	0	8
Palm Beach County Health Department	228.1	69.7	0.31	5	11
Pinellas County Health Department	374.7	14.6	0.04	2	0
City of Tampa Boiler-Mechanical Bureau	275.0	55.2	0.20	1	1
GEORGIA State Department of Public Health	3943.1	91.2	0.02	8	0
Atlanta Department of Buildings	487.5	15.4	0.03	1	1
Chatham County Health Department	188.3	19.1	0.10	1	1
Fulton County Health Department	110.2	30.0	0.27	3	1
Macon Bibb County Health Department	141.2	20.6	0.15	1	3

Agency	Population Served(1960 Census)	1967 Budget	Per Capita Budget	Positions Budgeted FT	PT
HAWAII State Department of Health	632.8	52.1	0.08	6	4
IDAHO State Department of Health					
ILLINOIS State Department of Public Health	10081.2	130.8	0.01	24	4
Chicago Department Air Pollution Control	3550.4	1,523.0	0.43	133	1
Cook County Air Pollution Control Bureau	1,579.3	168.4		13	0
INDIANA State Air Pollution Control Board	4662.5	81.8	0.02	8	1
East Chicago Department of Air Quality Control	57.7	40.3	0.70	4	0
Evansville Department of Smoke Abatement	141.5	26.9	0.19	3	2
Gary Department of Health	178.3	107.6	0.60	5	0
Indianapolis Bureau of Air Pollution Control	476.3	28.2		6	0
Michigan City Department of Public Health	36.7	8.4		0	1
Hammond Health Department		36.0			
Vigo County Health Department		48.0			

Agency	Population Served(1960 Census)	1967 Budget	Per Capita Budget	Position Budgeted FT	PT
IOWA State Department of Health					
Cedar Rapids Department of Health	92.0	21.6	0.23	3	1
KANSAS State Department of Health	2178.6			2	2
Kansas City-Wyandotte County Health Department	185.5	98.5	0.53	6	2
KENTUCKY State Department of Health	3038.2	295.2	0.10	26	1
Jefferson County Air Pollution Control District	610.9	84.1	0.14	13	0
LOUISIANA State Air Control Commission	3257.0	95.8	0.03	8	10
MARYLAND State Department of Health	3101.0	95.1	0.03	11	0
Anne Arundel County Office of Planning and Zoning		27.0			
Baltimore Bureau of Industrial Hygiene	939.0	185.5	0.20	11	0
Baltimore County Department of Health	492.4	107.0	0.22	6	0

Agency	Population Served(1960 Census)	1967 Budget	Per Capita Budget	Positions Budgeted FT	PT
Montgomery County	340.9	13.1	0.04	2	1
MASSACHUSETTS State Department of Health	5148.6	190.0		20	3
MICHIGAN State Department of Public Health	7823.2	147.2	0.02	7	2
Detroit Department of Buildings and Safety Engineering	1670.1	448.6	0.27	37	0
Grand Rapids Division Air Pollution Control and Heating Inspection		10.0			
Muskegon Inspection Department	46.5	15.9	0.14	3	0
Muskegon County Health Department	149.9	21.2		1	2
River Rouge Division of Building Inspection	18.1	13.0		2	0
Wayne County Department of Health	996.2	193.4	0.19	14	0
MINNESOTA State Department of Health	3413.8	174.0		13	0

Agency	Population Served (1960 Census)	1967 Budget	Per Capita Budget	Positions Budgeted FT	PT
Minneapolis Department of Buildings and Inspection	482.9	67.1	0.14	6	1
St. Paul Department of Public Utilities	313.4	88.8	0.28	7	3
St. Louis County		30.1			
MISSOURI State Air Conservation Commission	4319.8	136.0	0.03	7	0
Kansas City Health Department	475.5	118.1	0.25	8	3
City of St. Louis Department of Safety	750.0	250.4	0.33	28	0
St. Louis County Health Department	703.5	209.9	0.30	14	5
Springfield-Green County Air Pollution Control Authority	121.3	31.3	0.26	1	4
MONTANA State Board of Health	674.8	39.8			
Missoula City-County	44.7	12.0			
NEBRASKA Lincoln and Lancaster County	183.8	30.0		5	2
Omaha, Douglas Counties Health Department	343.5	32.0	0.09	5	2

Agency	Population Served (1960 Cnsus)	1967 Budget	Per Capita Budget	Positions Budgeted FT	Positions Budgeted PT
NEVADA					
State Department of Health and Welfare	285.3				
Reno, Sparks and Washoe County District Health Department	84.7	47.0	0.55	5	0
Clark County District Health Department	127.0	50.0		2	0
NEW HAMPSHIRE					
State Department of Health and Welfare	606.9	31.2	0.05	3	1
NEW JERSEY					
State Department of Health	6066.8	960.6	0.16	69	0
Camden Department of Health, Recreation and Welfare	117.2	7.2		1	0
East Orange Health Department	77.3	14.3	0.18	4	0
Elizabeth		10.0			
Jersey City Division of Health and Welfare	276.1	14.8	0.05	2	1
Newark Department of Health and Welfare		66.0			
Perth Amboy Bureau Air Pollution Control		30.0			
Trenton Department of Health, Recreation and Welfare	114.2	6.6		1	1
NEW MEXICO					
State Department of Public Health	951.0	29.4	0.03	3	5

Agency	Population Served(1960 Census)	1967 Budget	Per Capita Budget	Poistions Budgeted	
				FT	PT
Albuquerque-Bernalillo Department of Environmental Health	201.2	65.5	0.33	6	14
NEW YORK State Department of Health	16,782.3	2,074.0	0.01	94	0
Albany County Health Department	272.9	14.2	0.05	2	3
Broome County Health Department		10.2			
Buffalo Inspection of Boilers and Bureau of Smoke Abatement	523.8	80.0	0.15	7	0
Chemung County	98.7	8.0		3	0
Columbia County Health Cepartment		6.0			
Dutchess County Health Deaprtment	176.0	5.0		0	14
Erie County Department of Health	1064.7	272.0	0.25	22	2
Mt. Vernon Department of Health	76.0	8.2		0	3
Nassau County Health Department	1,300.2	237.5	0.18	25	1
New Rochelle Department of Public Health	76.8	17.8	0.23	1	1
New York City Department of Air Pollution Control	7782.0	2771.4	0.36	157	0

Agency	Population Served(1960 Census)	1967 Budget	Per Capita Budget	Positions Budgeted FT	PT
Niagara County Health Department	242.3	58.4	0.24	4	11
Rensseloer County Health Department	142.6	5.6		11	0
Rochester Department of Urban Renewal and Economic Development		10.0			
Schenectady Health Department	81.7	6.4		0	4
Suffolk County Department of Health	666.8	32.0	0.05	2	0
Syracuse Department of Health	216.0	50.0		3	0
Westchester County Department of Health	465.4	14.0	0.03	0	6
Yonkers Department of Health	190.6	13.5	0.07	0	2
NORTH CAROLINA Asheville Cepartment of Public Health	60.2	18.8	0.31	4	0
Beaufort County Health Department	110.4	44.4		1	10
Buncombe, Haywood, Henderson and Transylvania Counties	162.1	17.7	0.11	4	3
Cleveland County Health Department	66.0	23.2		0	4
Durham County Health Department	112.0	13.4		11	0

Agency	Population Served(1960 Census)	1967 Budget	Per Capita Budget	Positions Budgeted FT	PT
Gaston County Health Department	127.1	21.0	0.16	1	8
Guilford County Health Department	246.5	19.2		11	0
Mecklenburg County Health Department	272.1	43.6	0.16	2	6
New Hanover County Health Department	71.7	16.7	0.23	0	5
Rowan County Health Department	82.8	16.7	0.20	0	4
Winston-Salem Inspections Division		17.0			
NORTH DAKOTA State Health Department	632.4	15.0	0.02	2	1
OHIO State Health Department	9706.4	128.0	0.01	7	0
Akron Department of Health	326.2	130.5	0.40	9	1
Cincinnati Department of Safety	545.4	116.8	0.21	12	2
Cleveland Department of Public and Welfare	876.0	293.7	0.33	38	0
Columbus Department of Public Safety	471.3	80.0	0.17	8	1
Dayton Department of Service and Buildings	262.3	22.7	0.09	3	0
Lorain Department of Public Service	68.9	29.1	0.42	3	0

Agency	Population Served(1960 Census)	1967 Budget	Per Capita Budget	Positions Budgeted FT	PT
Portsmouth City Health Department	33.6	25.7	0.76	1	2
Toledo Department of Public Service	335.7	67.5	0.20	5	3
Youngstown Department of Public Works	166.7	19.1	0.11	2	0
Steubenville Service Department	32.5	28.5	0.88	3	1
Lake County Health Department	148.7			1	1
Canton City Health Department	113.6	83.8	0.74	4	1
OKLAHOMA State Department of Health	2328.3	10.3	0.00	0	3
Oklahoma City-County Health Department	439.5	13.6	0.03	1	2
Tulsa City-County Health Department	349.5	37.0	0.11	0	4
OREGON State Board of Health	1768.7	187.4	0.11	13	0
Lane County Air Quality Control	162.9	23.4	0.14	5	0
Mid-Willamette Valley Air Pollution Authority	377.9	56.5	0.20	4	0
Portland Bureau of Health	372.7	142.5	0.37	19	0

Agency	Population Served(1960 Census)	1967 Budget	Per Capita Budget	Positions Budgeted FT	PT
PENNSYLVANIA State Department of Health	7688.3	369.5	0.05	44	0
Allegheny County Health Department	1628.6	423.1	0.26	35	1
Erie Division of Smoke Abatement	138.4	11.0		0	2
Philadelphia Department of Public Health	2002.5	513.3	0.26	41	16
York Air Pollution Control Board	103.0	20.0	0.19	1	2
Lehigh Valley Air Pollution Control District		15.5			
RHODE ISLAND State Department of Health	859.5				
Providence Department of Building Inspection	207.5	42.6	0.20	0	9
SOUTH CAROLINA State Board of Health	2382.6	70.6	0.03	3	1
Charleston County Health Department	216.4	34.0	0.16	3	1
TENNESSEE State Department of Public Health	3567.1	25.4	0.01	2	1

Agency	Population Served(1960 Census)	1967 Budget	Per Capita Budget	Positions Budgeted FT	PT
Chattanooga Bureau of Air Pollution and Boiler Inspection	130.0	40.6	0.31	5	0
Knoxville Department of Public Service	11.8	15.6	0.14	3	0
Memphis City and Shelby County Health Department	627.0	29.0	0.05	5	3
Nashville and Davidson County Department of Health	399.7	32.9	0.08	8	1
TEXAS					
Texas Air Control Board	9579.7	105.4	0.01	7	0
Dallas City Health Department	951.5	65.6	0.07	6	12
Houston City Health Department	938.2	300.5	0.32	24	10
Lubbock City-County Health Department	156.3	20.2	0.13	2	3
UTAH					
State Health Department	890.6	42.0	0.01	2	3
Salt Lake City Health Department	189.5	14.0	0.07	0	1
VIRGINIA					
State Air Pollution Control Board	3966.9	19.0	0.01	1	0
Richmond Department of Public Safety	220.0	37.1	0.17	4	3

Agency	Population Served(1960 Census)	1967 Budget	Per Capita Budget	Positions Budgeted FT	PT
Roanoke Department of Air Pollution Control	97.1	12.3	0.13	0	1
Roanoke County Health Department	61.7	16.1	0.26	0	1
WASHINGTON State Department of Health	2853.2	80.0	0.03	8	5
Seattle and King County Health Department	935.0	268.0	0.29	22	0
Spokane Health Department	181.6	8.2		0	4
Tacoma and Pierce County Health Department	148.0	48.0	0.32	2	0
Clark County	93.8	16.6			
WEST VIRGINIA City of Wheeling Building Inspection Department	53.4	19.9	0.37	2	0
WISCONSIN Milwaukee County Health Department	1036.0	212.7	0.20	0	19
PUERTO RICO Puerto Rico Department of Health	2349.5	175.7	0.07	18	14

POSITIONS BUDGETED BY STATE AND LOCAL AIR POLLUTION CONTROL AGENCIES (FY 1967)

AGENCY	*	JOB CLASSIFICATION										TOTAL
		Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Gen. & Adm.	All Other	
ALABAMA Bureau of Environmental Health	FT	4	2						1			7
	PT	1	0						0			1
Department of Inspection Serv. Birmingham	FT							2				2
	PT							0				0
Bu. of Env. Health, Jefferson Co., Birmingham	FT	4	1						2		3	10
	PT	2	0						0		3	5
Huntsville Air Pollution Control Board	FT							1			0	1
	PT							0			1	1
Mobile County Board of Health	FT	0				1	1				1	3
	PT	1				0	0				1	2
ARIZONA Airzona State Depar. of Health	FT											
	PT				NO PROGRAM							
Maricopa County Health Department	FT	2	2			4			2		1	11
	PT	2	0			40			0		0	42
Pima County Health Department	FT	1				2			0		0	3
	PT	0				0			1		1	2
ARKANSAS State of Arkansas Poll. Control Com.	FT	1	1				1		7		1	11
	PT	3	1				1		0		0	5
CALIFORNIA California State Dept. of Health	FT	25	1	1	6		6		19		25	83
	PT	0	25	0	0		0		1		3	29
California Motor Vehicle Pollution Control Board	FT	8								1	11	20
	PT	0								0	0	0

* Data from Governmental Air Pollution Directory

AGENCY	*	JOB CLASSIFICATION										TOTAL
		Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Gen. & Adm.	All Other	
Bay Area Air Pollution Control District	FT	6	1	1	1		8	28	5	3	22	75
	PT	2	0	0	0		0	0	0	0	0	2
Contra Costa County Health Department	FT					0	0				0	0
	PT					1	1				1	3
Humboldt-Del Norte County Health Department	FT					1					0	1
	PT					0					4	4
Los Angeles County Air Pollution Control District	FT	71	15	3	4	0	12	89	27	9	75	305
	PT	0	0	0	0	0	0	0	0	0	0	0
Monteroy County Air Pollution Control District	FT										0	0
	PT										3	3
Orange County Air Pollution Control District	FT	2	1					3	3			9
	PT	0	0					0	0			0
Riverside County Air Pollution Control District	FT	3	1					2			2	8
	PT	0	0					0			0	0
Sacramento County Air Pollution Control District	FT	1	1									2
	PT	0	0									0
San Bernadino County Air Pollution Control District	FT	3	1					5	4	1	4	18
	PT	0	0					0	0	0	2	2
San Diego County Dept. of Public Health	FT	1	2	1			1					5
	PT	1	0	0			0					0
COLORADO Colorado Dept. of Public Health	FT	1	3						2		5	11
	PT	0	0						0		1	1

AGENCY	*	JOB CLASSIFICATION										TOTAL
		Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Pln. & Adm.	All Other	
Boulder City-County Health Department	FT					0	0				0	0
	PT					1	1				2	4
Denver City County Buidling Department	FT	4						10			3	17
	PT	0						0			2	2
Jefferson County Health Dept.	FT							1			0	1
	PT							0			4	4
Tri-County District Health Dept. Adams, Arapahoe &Douglas	FT					5				0	2	7
	PT					1				1	2	4
CONNECTICUT Conn. State Dept. of Health	FT	2	7			3					3	15
	PT	1	0			0					4	5
Bridgeport Fire Department*	FT							5				5
	PT							0				0
Fairfield Dept. of Health	FT					0		0			0	0
	PT					1		1			1	3
Greenwich Health Department	FT		0			0					0	0
	PT		1			5					2	8
Meridan Dept. of Health	FT					1					0	1
	PT					2					1	3
Middleton Board of Health*	FT					3						3
	PT					0						0
New Britain Health Department	FT					0	0		0		0	0
	PT					2	2		1		2	7

AGENCY	*	JOB CLASSIFICATION										TOTAL
		Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Gen. & Adm.	All Other	
New Haven Department of Health	FT	1				1	0			1	1	4
	PT	1				6	1			1	2	11
Stamford Building Department	FT				NO PROGRAM							
	PT											
Stratford Dept. of Health	FT					1	0				0	1
	PT					1	1				2	4
Delaware Water & Air Resources Comm.	FT				NO ANSWER							
	PT											
DIST. OF COLUMBIA Department of Public Health	FT	1	1					0	3		2	7
	PT	2	0					6	0		0	8
FLORIDA State Board of Health*	FT	6	4			2			2		3	17
	PT	0	0			0			0		0	0
Dade County Dept. of Public Health	FT	3	1					6	1	1	3	15
	PT	0	0					0	0	0	0	0
Duval County Air Improvement Authority	FT	3					1		5		1	10
	PT	0					0		0		0	0
Hillsborough County Health Department	FT	0	0						2		0	2
	PT	1	1						0		1	3
Manatee County Health Department	FT	0	0						0		0	0
	PT	1	2						4		1	8
Palm Beach County Health Department	FT	2	1			0				0	2	5
	PT	2	0			5				1	1	11

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AGENCY	*	JOB CLASSIFICATION										TOTAL
		Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Mgn. & Adm.	All Other	
Pinellas County Health Department	FT	1	1									2
	PT	0	0									0
City of Tampa Boiler-Mechanical Bureau	FT							1				1
	PT							1				1
GEORGIA State Department of Public Health	FT					6			2			2
	PT					0			0			0
Atlanta Dept. of Buildings	FT	1									0	1
	PT	0									1	1
Chatham County Health Department	FT					1						1
	PT					1						1
Fulton County Health Department	FT					3						3
	PT					1						1
Macon Bibb County Health Department	FT	0				1					0	1
	PT	1				1					1	3
HAWAII State Department of Health	FT	1	2			0	1	1			1	6
	PT	2	0			1	0	0			1	4
IDAHO State Department of Health	FT				NO ANSWER							
	PT											
ILLINOIS State Department of Health	FT	13	1			4			2		4	24
	PT	2	0			0			0		2	4
Chicago Dept. of Air Pollution Control	FT	30	8	2				45	14	10	24	133
	PT	0	0	0				0	1	0	0	1

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AGENCY	*	JOB CLASSIFICATION Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Mgn. & Adm.	All Other	TOTAL
Cook County Air Pollution Control*	FT	1	1		1			5	2		3	13
	PT	0	0		0			0	0		0	0
INDIANA State Air Pollution Control Board	FT	4	2			1					1	8
	PT	1	0			0					0	1
East Chicago Department of Air Quality Control	FT		1					1			2	4
	PT		0					0			0	0
Evansville Dept. of Smoke Abatement	FT	1						1			1	3
	PT	0						0			2	2
Gary Department of Health	FT	1	1			1		2				5
	PT	0	0			0		0				0
Indianapolis Bureau of Air Pollution Control	FT	2						4				6
	PT	0						0				0
Michigan City Department of Public Health	FT					0						0
	PT					1						1
IOWA State Department of Health	FT					NO ANSWER						
	PT											
Cedar Rapids Department of Health	FT	1	1							0	1	3
	PT	0	0							1	0	1
KANSAS State Department of Health	FT										2	2
	PT										0	0
Kansas City-Wyandotte Co. Health Department	FT	2						1	2		1	6
	PT	1						0	0		1	2

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AGENCY	*	JOB CLASSIFICATION										TOTAL
		Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Mgn. & Adm.	All Other	
KENTUCKY State Department of Health	FT	9	5			1		3	1		7	26
	PT	1	0			0		0	0		0	1
Jefferson County Air Pollution Control District	FT	2						9			2	13
	PT	0						0			0	0
LOUISIANA State Air Control Commission	FT	2	2			1			1		2	8
	PT	10	0			0			0		0	10
MAINE State Department of Health	FT				NO PROGRAM							
	PT											
ARYLAND State Department of Health	FT	4		1		3					3	11
	PT	0		0		0					0	0
Anne Arundel County Office of Planning & Zoning	FT				NO ANSWER							
	PT											
Bureau of Industrial Hygiene, Baltimore	FT	3				8						11
	PT	0				0						0
Baltimore County Department of Health	FT	1				4					1	6
	PT	0				0					0	0
Montgomery County	FT					1		1				2
	PT					1		0				1
Prince George County H.D.	FT	0										0
	PT	1										1
MASSACHUSETTS State Department f Health	FT	5	0					11	1		3	20
	PT	1	1					0	0		1	3

AGENCY	*	JOB CLASSIFICATION										TOTAL
		Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Mgn. & Adm.	All Other	
MICHIGAN State Department of Public Health	FT	3	1						1		2	7
	PT	1	0						0		1	2
Detroit Dept. of Buildings & Engineering	FT	9	3					17			8	37
	PT	0	0					0			0	0
Grand Rapids Div. Air Pollution Control & Heating Inspection	FT				NO ANSWER							
	PT											
Muskegon Inspection Department*	FT							3				3
	PT							0				0
River Rouge Division of Building Inspection*	FT							2				2
	PT							0				0
Muskegon County Health Department	FT	1									0	1
	PT	0									2	2
Wayne County Department of Health	FT	8	1			1	1				3	14
	PT	0	0			0	0				0	0
Dearborn Bldg. & Safety Division	FT	1									1	2
	PT	0									0	0
MINNESOTA State Department of Health	FT	6	2						2		3	13
	PT	0	0						0		0	0
Minnespolis Department of Buildings & Inspection	FT	2	1					0	2		1	6
	PT	0	0					8	0		0	1
St. Paul Department of Public Utilities	FT	0	0					5	1		1	7
	PT	1	2					0	0		0	3

AGENCY	*	JOB CLASSIFICATION Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Mgn. & Adm.	All Other	TOTAL
MISSOURI State Air Conservation Commission	FT						3		1	1	2	7
	PT						0		0	0	0	0
Kansas City Health Department	FT	1	1			2	0	3			1	8
	PT	0	0			0	1	0			2	3
City of St. Louis Department of Public Health	FT	4	1					15	1		7	28
	PT	0	0					0	0		0	0
St. Louis County Health Department	FT	4				4	2		1		3	14
	PT	1				0	2		1		1	5
Springfield-Green County Air Pollution Control Authority	FT					1	0				0	1
	PT					2	1				1	4
MONTANA State Board of Health	FT					NO ANSWER						
	PT											
NEBRASKA State Department of Health	FT					NO PROGRAM						
	PT											
Lincoln and Lancaster County*	FT	1				1						2
	PT	0				0						0
Omaha, Douglas Counties Health Department	FT	1				3	1					5
	PT	2				0	0					2
NEVADA - State Department of Health & Welfare	FT					NO PROGRAM						
	PT											
Clark County District Health Department	FT						1	2			2	5
	PT						0	0			0	0

AGENCY	*	JOB CLASSIFICATION										TOTAL
		Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Mgn. & Adm.	All Other	
Reno, Sparks and Washoe Counties District H.D.	FT						1	2			2	5
	PT						0	0			0	0
NEW HAMPSHIRE State Department of Health and Welfare	FT	1	2				0					3
	PT	0	0				1					1
NEW JERSEY State Department of Health	FT	22	2			12	2	3	6	2	20	69
	PT	0	0			0	0	0	0	0	0	0
Camden Department of Health, Recreation & Welfare	FT							1				1
	PT							0				0
East Orange Health Department	FT	2						1			1	4
	PT	0						0			0	0
Elizabeth	FT					NO ANSWER						
	PT											
Jersey City Division of Health and Welfare	FT							2			0	2
	PT							0			1	1
Newark Department of Health & Welfare	FT											
	PT					NO ANSWER						
Perth Amboy Bureau of Air Pollution Control	FT											
	PT					NO ANSWER						
Trenton Department of Health, Recreation & Welfare	FT							1			0	1
	PT							0			1	1
NEW MEXICO - State Department of Public Health	FT	0	0			2	1				1	4
	PT	1	1			1	1				1	5

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AGENCY	*	JOB CLASSIFICATION										TOTAL
		Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	[illegible]gn. & Adm.	All Other	
Albuquerque-Bernalillo County Department of Environmental Health	FT	1				1		3			1	6
	PT	0				12		0			2	14
NEW YORK State Department of Health	FT	40	8	1	1				17	1	26	94
	PT	0	0	0	0				0	0	0	0
Albany County Health Department	FT	0							2			2
	FT	2							1			3
Broome County Health Department	FT					NO ANSWER						
	PT											
ffalo Inspection of Boilers & Bureau of Smoke Abatement	FT							7				7
	PT							0				0
Chemung County*	FT	1						2				3
	PT	0						0				0
Dutchess County Health Department	FT	0				0			0		0	0
	PT	4				4			5		1	14
Erie County Health Department	FT	4	2			1	4		8		3	22
	PT	1	0			0	0		0		1	2
Mt. Vernon Department of Health	FT	0				0		0				0
	PT	1				1		1				3
Nassau Health Department	FT	4	2			9			6		4	25
	PT	0	0			1			0		0	1
Niagara County alth Department	FT	0				1		2			1	4
	PT	1				2		7			1	11

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AGENCY	*	JOB CLASSIFICATION										TOTAL
		Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Mgn. & Adm.	All Other	
New Rochelle Department of Public Health	FT	0							1			1
	PT	1							0			1
New York City Department of Air Pollution Control	FT	32	10	1	2			51	3	9	49	157
	PT	0	0	0	0			0	0	0	0	0
Rensseloer County Health Department *	FT	2	1			2		6				11
	PT	0	0			0		0				0
Rochester Dept. of Urban Renewal & Economic Development	FT					NO ANSWER						
	PT											
henectady Health Department	FT	0				0			0			0
	PT	1				1			2			4
Suffolk County Department of Health	FT	1							1			2
	PT	0							0			0
Syracuse Department of Health	FT							3				3
	PT							0				0
Westchester County Department of Health	FT	0				0			0		0	0
	PT	2				1			1		2	6
Yonkers Dept. of Health	FT	0				0						0
	PT	1				1						2
NORTH CAROLINA State Department of Health	FT					NO PROGRAM						
	PT											
Ashoville Department of Public Safety	FT							3			1	4
	PT							0			0	0

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AGENCY	*	JOB CLASSIFICATION										TOTAL
		Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Mgn. & Adm.	All Other	
Beaufort County Health Department	FT					1			0		0	1
	PT					8			1		1	10
Buncombe, Haywood, Henderson & Transylvania Counties	FT	2				2						4
	PT	0				3						3
Cleveland County Health Department	FT					0		0			0	0
	PT					1		1			2	4
Durham County Health Department*	FT					11						11
	PT					0						0
aston County Health Department	FT					1					0	1
	PT					6					2	8
Guilford County Health Department*	FT		1			3				1	6	11
	PT		0			0				0	0	0
Mecklenburg County Health Department	FT					1		1	0		0	2
	PT					2		1	1		2	6
New Hanover County Health Department	FT					0			0		0	0
	PT					2			1		2	5
Rowan County Health Department	FT					0					0	0
	PT					2					2	4
Winston-Salem Inspections Division	FT					NO ANSWER						
	PT											
NORTH DAKOTA State Department f Health	FT	1	1									2
	PT	1	0									1

AGENCY	*	JOB CLASSIFICATION										TOTAL
		Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Mgn. & Adm.	All Other	
OHIO **State Health Department**	FT	3	2						1		1	7
	PT	0	0						0		0	0
Akron Department of Health	FT	0	2			4		1	1		1	9
	PT	1	0			0		0	0		0	1
Cincinnati Department of Safety	FT	1						6	3		2	12
	PT	2						0	0		0	2
Cleveland Department of Public Health & Welfare	FT		6			2	13	13	4			38
	PT		0			0	0	0	0			0
Columbus Department of Public Safety	FT	0	1					6			1	8
	PT	1	0					0			0	1
Dayton Department of Service & Buildings	FT	1	1					1				3
	PT	0	0					0				0
Lorain Department of Public Service	FT							2			1	3
	PT							0			0	0
Portsmouth City Health Department	FT						0	1			0	1
	PT						1	0			1	2
Toledo Department of Public Service	FT						0	5			0	5
	PT						1	0			2	3
Youngstown Department of Public Works	FT	1						1				2
	PT	0						0				0
Steubenville Service Department	FT								1	1	1	3
	PT								0	0	1	2

AGENCY	*	JOB CLASSIFICATION										TOTAL
		Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Mgn. & Adm.	All Other	
Lake County Health Department	FT					1						1
	PT					1						1
Canton City Health Department	FT	1	1			1					1	4
	PT	0	0			0					1	1
OKLAHOMA State Department of Health	FT	0					0					0
	PT	2					1					3
Oklahoma City-County Health Department	FT						1				0	1
	PT						1				1	2
Tulsa City-County Health Department	FT	0	0			0	0					0
	PT	1	1			1	1					4
OREGON State Board of Health	FT	5	4			2					2	13
	PT	0	0			0					0	0
Lane County Air Quality Control	FT							1	1		3	5
	PT							0	0		0	0
Mid-Western Valley Air Pollution Authority	FT	1				1				1	1	4
	PT	0				0				0	0	0
Portland Bureau of Health	FT	4	1			7			2		5	19
	PT	0	0			0			0		0	0
PENNSYLVANIA State Department of Health	FT	27	3	3					11			44
	PT	0	0	0					0			0
Allegheny County Health Department	FT	12	4				4	15				35
	PT	0	0				1	0				1

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AGENCY	*	JOB CLASSIFICATION										TOTAL
		Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Mgn. & Adm.	All Other	
Erie Division of Smoke Abatement	FT							0			0	0
	PT							1			1	2
Philadelphia Department of Public Health	FT	13	0		1	1	1	17	3		5	41
	PT	5	5		0	0	0	0	4		2	16
York Air Pollution Control Board	FT										1	1
	PT										2	2
RHODE ISLAND State Department of Health	FT											
	PT					NO ANSWER						
Providence Department of Building Inspection	FT	0						0				0
	PT	1						8				9
SOUTH CAROLINA State Board of Health	FT	1	1						1			3
	PT	1	0						0			1
Charleston County Health Department	FT	1	1			0					1	3
	PT	0	0			1					0	1
SOUTH DAKOTA Department of Health	FT											
	PT					NO PROGRAM						
TENNESSEE State Department of Public Health	FT	1	1									2
	PT	1	0									1
Chattanooga Bureau of Air Pollution Control & Boiler Ins	FT							3			2	5
	PT							0			0	0
Knoxville Department of Public Service	FT							2			1	3
	PT							0			0	0

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AGENCY	*	Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Mgn. & Adm.	All Other	TOTAL
Memphis City & Shelby County Health Department	FT	1	1			1		1			1	5
	PT	2	0			0		1			0	3
Nashville & Davidson County Department of Health	FT	3	1			1		1			2	8
	PT	1	0			0		0			0	1
TEXAS Texas Air Control Board	FT	5	1			1						7
	PT	0	0			0						0
Dallas City Health Department	FT	1	1			3				0	1	6
	PT	2	0			8				1	1	12
Houston City Health Department	FT	0	2	1			6	8	1	0	6	24
	PT	1	1	0			2	0	0	1	5	10
Lubbock City-County Health Department	FT		1			0		1			0	2
	PT		0			2		0			1	3
UTAH State Health Department	FT						2					2
	PT						3					3
Salt Lake City Health Department	FT					0						0
	PT					1						1
VIRGINIA State Air Pollution Control Board	FT										1	1
	PT										0	0
Richmond Department of Public Safety	FT	1						3			0	4
	PT	1						0			2	3
Roanoke Department of Air Pollution Control	FT							0				0
	PT							1				1

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AGENCY	*	Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Gen. & Adm.	All Other	TOTAL
Roanoke County Health Department	FT					0						0
	PT					1						1
WASHINGTON State Department of Health	FT	5	1				1		1			8
	PT	2	2				1		0			5
Seattle & King County Health Department	FT	3		2		2	2	7	2		4	22
	PT	0		0		0	0	0	0		0	0
Spokane Health Department	FT					0					0	0
	PT					3					1	4
Tacoma & Pierce County Health Department	FT	1		1								2
	PT	0		0								0
WEST VIRGINIA Air Pollution Control Commission	FT											
	PT					NO ANSWER						
City of Wheeling Building Inspection	FT										2	2
	PT										0	0
WISCONSIN State Health Department	FT											
	PT					NO PROGRAM						
Milwaukee County Health Department	FT	3	1					10	1		4	19
	PT	0	0					0	0		0	0
WYOMING State Department of Health	FT	0										0
	PT	1										1
ALASKA epartment of Health & Welfare	FT											
	PT					NO PROGRAM						

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AGENCY	*	JOB CLASSIFICATION										TOTAL
		Eng.	Chm.	Mtr.	Stat.	San.	Oth. Sci.	Insp.	Tech.	Mgn. & Adm.	All Other	
PUERTO RICO Department of Health	FT	2	2			2	1	4			7	18
	PT	0	0			5	0	5			4	14
	FT											
	PT											
	FT											
	PT											
	FT											
	PT											
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